

Summertime Operation and Trouble Shooting, H. J. Marx; Advance Programs; Small Space Installation of Static-Free Underground Antennas, E. T. Jones

Radio Digest

EVERY WEEK **Illustrated** PROGRAMS **TEN CENTS**

REG. U. S. PAT. OFF. & DOM. OF CANADA

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NEW CIRCUIT IN ENGLAND

PHILHARMONIC GOES ON 3 TIMES WEEKLY

WJZ UNDERTAKES THIRD SUMMER SEASON

Broadcasts Popular Stadium Concerts In New York With Remote Control

NEW YORK.—Arrangements have been completed between the executive officers of the New York Philharmonic society and Radiocast WJZ, whereby that station will give the Stadium concerts by the Philharmonic orchestra, commencing with the first concert of the 1924 summer season.

WJZ will Radiocast three concerts a week direct from the Lewisohn Stadium, employing the same system of remote-control transmission as was used during the Radiocasting of the Stadium concerts in 1922 and 1923. This is the third consecutive year of WJZ's co-operation with the Philharmonic society.

Is Famous Symphony Body
The New York Philharmonic orchestra includes over 100 members this season, with Willem Van Hoogstraten conducting. The orchestra has long been one of the leading symphonic organizations of the world, and the Stadium concerts constitute one of the country's outstanding musical series of the summer.

An unusual feature of the present season is the visit of Fritz Reiner, conductor of the Cincinnati Symphony orchestra, as guest conductor of the concerts between July 24 and August 6, for no guest conductor has ever before directed a Stadium concert. Willem Van Hoogstraten, conductor of the New York Philharmonic orchestra, will direct the concerts from July 3 to July 24, and from August 6 until the final concert of the season on August 21.

WGY Players Desert Air During Hot Days

Student Radarists Take Their Place for Summer

SCHENECTADY, N. Y.—The WGY Players concluded their 1923-24 season of Radio performances with the production of "Cappy Ricks," a comedy based on Peter B. Kyne's lovable Pacific Coast shipper. The Radario will not be missing from WGY programs during the summer, however, as the WGY Student Players will be heard weekly in one-act plays and full-length dramas. Edward H. Smith, director of the players will be in charge of the student productions.

SHE JUST KNEW SHE HEARD HIM SAY SOS

DAYTON, O.—While testing out an airplane Radiophone set here recently, the embryo announcer, A. C. Studebaker, caused a commotion by starting to sing, "London Bridge Is Falling Down." The phone in the laboratory of McCook field began to ring. A feminine voice announced, "There's a man up there in distress. He keeps calling that he is 'falling down.' Can't you help him?"



Rita Rogan, eight-year-old motion picture actress, is known as the prettiest girl in the movies. Recently she appeared in a program given by well-known stage children from WOR, Newark.

BRITON'S SET INCORPORATES RADICAL IDEA

Use of Four Electrode Tube Eliminates Necessity of Plate Batteries

Conducting Experiments

Hook-Up Especially Adapted to Portable Outfits Where Light Weight Is Factor

No B batteries are required in the latest epoch-making and revolutionary circuit developed in England, which, despite the absence of the plate batteries, is said to function excellently and equal to, if not better than sets now in use.

With portable sets in the limelight there is a great demand for a set that doesn't require a lot of heavy, space-wasting B batteries. And England reports it has solved the problem through the medium of four electrode tubes!

Some of these English valves, as they call them over there, have been ordered so that a series of experiments can be conducted on the new circuits.

Collect Data in England
The information presented is the result of considerable data collected in England and prepared as an introduction.

It is not unknown to many that the three electrode tube will function properly when the plate battery is omitted and the return of the plate circuit is made to the positive terminal of the A battery. Unfortunately the amplification value of a three electrode vacuum tube without a plate battery appears to vanish entirely. Although three electrode tubes could be designed for very low plate potentials, yet the effect on the other characteristics of the tube would make it rather impractical at the present stage of research.

Four and Five Electrode Tubes

Four and five electrode tubes have been available in Europe for a considerable period of time. This has given many over there, the opportunity of individual research into this field. In this country,

(Continued on page 6)

Radio Manufacturer Census

WASHINGTON.—The bureau of census, for the first time, is taking a manufacturers' census of the Radio industry. The census is in connection with the manu-

facturers' census of 1923, begun by the bureau on the first of January.

Great Britain expects to institute a regular service of Radiocasting to the schools beginning in September.

HUGE HORN STANDS TWELVE FEET HIGH

CHICAGO.—Largest of any loud speaker in the world was the mammoth reproducer here in the Elizabethan room of the Congress hotel, used during the political conventions to repeat happenings at Cleveland and New York. It stood twelve feet high, was more than eight feet across the flare of the horn, and the hole from which the sound issued measured six feet in diameter.

No. 8 OFFICIAL BALLOT

Announcers' Contest

RADIO DIGEST FIRST ANNUAL GOLD CUP AWARD

Gold Cup Award Editor, Radio Digest,
510 North Dearborn St., Chicago, Ill.

Please credit this ballot as one vote for:

.....of Station.....
 (Announcer's name) (Call letters)
 Signed

Address

City.....State.....

If you desire, tell below in five or less words what you most like about the announcer for whom you have cast this ballot:

GOLD CUP ENTHUSES ARMY OF LISTENERS

STANDING OF ANNOUNCERS APPEARS IN TWO WEEKS

List of Nominees Reaches Total of 118—
Eighth Ballot Marks Halfway Point in Voting

Radio Digest's First Annual Gold Cup Award enthruses the whole invisible audience! From Key West to Seattle, Cape Cod to San Diego, come letters, nominations, ballots from anxious radiophans who desire to see their favorite announcer crowned King of the Ether World.

With this issue is given the eighth ballot, completing half the series. There will be eight more. Listeners sending in a complete series of eight ballots for their choice will be given a twenty-five vote bonus, or a total of thirty-three votes. BUT if the complete series of sixteen ballots is saved and voted at one time for one announcer, the lucky recipient will be credited with a bonus of seventy-five, or a total of ninety-one votes.

First Standing in Two Weeks

Hundreds of announcers and hundred thousands of listeners in will be gratified to know that the relative standings of the 118 nominees will appear issue after next. Beginning with the first announcement in the July 26 number, the tabulated standing will be brought up to date every week till the close of the balloting.

The rules and regulations governing the procedure, given last week, will be given again next issue. Remember to address all communications concerning the award to the Gold Cup Award Editor, Radio Digest, Chicago. Controversies over balloting, etc., which may arise will be settled by the Gold Cup Award Editor, whose decision will be final.

List of 118 Nominees

Twelve more announcers were nominated during the past week, bringing the total to 118. The complete list of these, with distinctive initials or nom de plume when used, follows:

- Adair, Sam, WOQ, Kansas City.
- Arlin, H. W., KDKA, East. Pittsburgh.
- Afnoux, G. C., WBAF, Fort Worth.
- Bach, A. E. W., WBZ, Springfield.
- Bachman, Miss Alberta, WBAH, Minneapolis.
- Bailey, S. T. (STB), KLX, Oakland.
- Barnes, E. T., WGY, Schenectady.
- Barnett, S. W. (BWS), WOC, Davenport.
- Becker, Otto, WGR, Buffalo.
- Bohannon, J. K., WTAR, Norfolk.
- Buell, Earle, WLAG, Minneapolis.
- Buhlert, F. A. (Spark Plug), KFJC, Seattle.
- Bertier, Jaques N., CKAC, Montreal, Can.
- Clark, David C. (DC), WHAM, Rochester.
- Claussing, Leroy, WEBH, Chicago.
- Coats, D. R. P., CKY, Winnipeg.
- Coggesil, A. O., WGY, Schenectady.
- Cole, N. D. (Old King Cole), WHO, Des Moines.
- Cooperman, Tess, WLAG, Minneapolis.
- Carigan, John J., WTAT, Boston.
- Carlin, Phillip, WEA, New York.
- Cowan, Thomas H., WJZ and WJY, New York.
- Cross, Milton J. (AJN), WJZ and WJY, New York.
- Cunning, L. C., WBZ, Springfield.
- Daggett, Uncle John, KHJ, Los Angeles.
- Darling, Walter, CFCF, Montreal.
- DePew, J. H., WCBD, Zion City.
- Dodge, Jack S., WNAC, Boston.
- Douherty, C. L., WSB, Atlanta.
- Eastman, M. L., KYW, Chicago.
- Edes, A. F., WBZ, Springfield.
- Ehrhart, Harry E. (HEE), WDA, Philadelphia.
- Emery, C. R., WGI, Medford Hillside.
- Entrekin, C. A., WCAI, Columbus.

- Erbstein, Charles (Ha Ha Man), WTAS, Elgin.
- Fanning, Major J. J., WNAC, Boston.
- Fay, Wm. A., WGY, Schenectady.
- Field, Henry, KFNF, Shenandoah.
- Fitzpatrick, Leo (Merry Old Chief), WDAF, Kansas City.
- Gaal, C. A., KUO, San Francisco.
- Graham, C. W., WIP, Philadelphia.
- Granlund, N. T. (NTG), New York.
- Grant, W. W., CFCN, Calgary.
- Greene, P. A., WSAI, Cincinnati.
- Hager, Kolin (KH), WGY, Schenectady.
- Haller, Richard V., KGW, Portland.
- Hammond, Carl E., KFOA, Seattle.
- Harnach, F. F., KDKA, E. Pittsburgh.
- Harrington, Ted, WCX, Detroit.
- Harris, Credo, WHAS, Louisville.
- Harrison, P. W., WBZ, Springfield.
- Hatfield, Helen G., WCK, St. Louis.
- Hay, Bill, KFKX, Hastings.
- Hay, George (The Solemn Judge), WLS, Chicago.
- Hayner, Rutherford, WHAZ, Troy.
- Hired Hand, WBAF, Ft. Worth.
- Herske, Arthur R., WTAM, Cleveland.
- Jester, Carl, WGY, Schenectady.

- Johnson, Elmer (Swan) G., WJAX, Cleveland.
- Johnson, F. W. (FWJ), CHYC, Montreal.
- Johnson, Paul, WLAG, Minneapolis.
- Jones, Miss V. A. L., KSD, St. Louis.
- Kaney, Sen A. W., WGN, Chicago.
- Kay, Lambdin, WSB, Atlanta.
- Kerly, E. J., KFOV, Sioux City.
- Kirby, Corley F. (CFK), WWJ, Detroit.
- Ludgate, William, KSD, St. Louis.
- Mack, Johnnie, WJAS, Pittsburgh.
- MacPhee, Don, WAAW, Omaha.
- Martin, Victor, WHAM, Rochester.
- McNamee, Graham, WEA, New York.
- Mentzer, Carl, WHAA, Iowa City.
- Milholland, Howard, KGO, Oakland.
- Mullen, J. E., KDKA, E. Pittsburgh.
- Munn, Robert, WGR, Buffalo.
- Nelson, Jack, WDAP, Chicago.
- Palmer, Lester (LP), WOAW, Omaha.
- Paschal, —, WOR, Newark.
- Patt, John, WDAF, Kansas City.
- Pearson, W. G., WCAP, Washington.
- Perham, D. M., WJAM, Cedar Rapids.
- Pierce, Jennings, KGO, Oakland.
- Pierce, F. W. (ANR), WOC, Davenport.
- Pierson, Wm. T., WCAP, Washington.
- Poehler, Eleanor, WLAG, Minneapolis.
- Randall, C. R., WCAE, New Orleans.
- Reese, Paul, KFI, Los Angeles.
- Reid, J. Lewis, WJZ, New York.
- Reilly, John, WJAR, Providence.
- Reynolds, R. F., WEAN, Providence.
- Rice, —, CJCA, Edmonton, Canada.
- Robinson, Irving B., WNAC, Boston.
- Rose, William, CKCD, Vancouver.
- Rothafel, S. L. (Roxie), WEA, New York.
- Rouse, Gene (GR), WOAW, Omaha.
- Sartory, Joseph, WCAE, Pittsburgh.
- Salyer, Harold A., WHAS, Louisville.
- Schilling, John T., WHB, Kansas City.
- Smith, Fred, WLW, Cincinnati.
- Smith, Edward H. (Uncle Josh), WGY, Schenectady.
- Smith, George, WEBH, Chicago.
- Stafford, H. E., WSAE, Providence.
- Stefan, Karl, WJAG, Norfolk.
- Sullivan, Jerry, WQJ, Chicago.
- Sweet, Ray R., WLAG, Minneapolis.
- Tatom, WCAR, San Antonio.
- Tison, W. W., WSB, Atlanta.
- Tomy, C. D., WCX, Detroit.
- Trumbull, Steve, KYW, Chicago.
- Tyson, Edwin L., WWJ, Detroit.
- Uncle Kaybee, WCAE, Pittsburgh.
- White, Major Andrew, WJZ, New York.
- Weidaw, Robert, WGY, Schenectady.
- Whitney, Robert S., WMAQ, Chicago.
- Willets, G. V. (GWW), WOC, Davenport.
- Wilson, R. H., KDKA, E. Pittsburgh.
- Wilson, Walter, KYW, Chicago.
- Witten, J. M. (JMW), WOS, Jefferson City.

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Looking Ahead

"What One Tube Can Do" is the intriguing topic Paul Edelman discusses next issue. He discusses the many possible variations of the single tube circuit, bringing about a realization of its true capabilities. Each function of the tube is studied in detail, and the method of linking the various functions into a unified, working receiver, is demonstrated. You'll like this "Thirty-Minute A-B-C" lesson.

Eliminating the B Battery by the use of four electrode tubes is the subject of an interesting article next week by H. J. Marx. This is a continuation of the treatise on the new English "Unidyne" receiver, the first part of which is given this issue. While four electrode tubes are not available at this time in America, it is believed that the popularity of the Unidyne may force their production and sale.

Improving the Single Circuit Tuner promises to tear up a lot of old single circuit sets. G. S. Corpe's experiments and suggestions, to appear next week, will undoubtedly be hailed with delight by many adherents to this simple type of foolproof receiver. The necessary changes are described in detail by Mr. Corpe.

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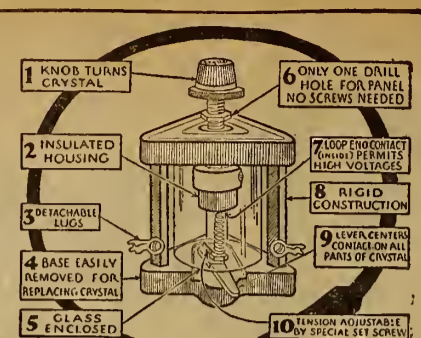
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 - Penn. Nightingale Co.....Bellevue, Pa.
 - Badger Radio Co.....Milwaukee, Wis.
 - Phil Gross Hdw. Co.....Milwaukee, Wis.
 - Goulding Mfg. Co.....Milwaukee, Wis.

COUNTRYSIDE HEARS FLYERS TALK IN AIR

TEST RETRANSMISSION OF AERIAL CONVERSATION

Aviators' Description of Washington, D. C., at Night Heard Clearly in Eastern U. S.

By L. M. Lamm

WASHINGTON, D. C.—Flying just under the clouds above the city and environs recently, two aviators in an army airplane demonstrated for the first time the practicability of retransmission by land Radiocast of Radiophone conversation sent out from a plane.

Constantly in communication with Station WRC, Radio Corporation of America, here, the airmen gave a running description of the picture of Washington at night, which was heard clearly in all parts of the city, in Baltimore and probably over a great part of eastern United States. The flight was for the purpose of showing the development of Radio in aviation.

With Lieut. Donald Bruner as pilot and Lieut. Burdette S. Wright as observer and communications officer a specially equipped plane took off from Bolling field. In a few minutes its red and green navigation lights were sighted as the plane approached the Capitol and then the plane began to play its searchlight on the stately dome. Presently there came the plain, far away voice of Lieut Wright as he called, "Hello, WRC."

Keep Up Constant Talk

At the station, Lieut. L. L. Koontz established communication with the plane and from then on there was constant conversation between the two, partly marred by heavy static. Although Lieut. Wright came through plainly at all times to Station WRC, he had difficulty in understanding Lieut. Koontz because of poor atmospheric conditions. Some amateur stations reported they had difficulty during the latter half of the flight in hearing the plane, but it is believed this was while Station WRC was attempting to reradiocast.

At the first, the plane used a wave length of 469 meters and then at the direction of Lieut. Koontz increased its wave length to 750 meters in order that WRC might reradiocast on 469 meters. During this experiment, amateur sets tuned to WRC got a double dose of static. In a test the morning after, however, the arrangement worked successfully under better atmospheric conditions.

Built Plant, Owns It, Runs It—All Himself

Dr. Landry Operates One-Man Station at CJCM

MOUNT-JOLI, QUE.—Besides being owner, announcer and vaudevillian at Radiocast CJCM here, Dr. J. L. P. Landry is also the builder. In fact, the doctor has had very little assistance, and has built antenna masts, chokes, condensers, transformers and whatnot for his 500-watt Radiocast, so often heard in the States.

It is said that the only manufactured parts of CJCM are the vacuum tubes, electrical measuring instruments and the generator, which only recently burned out. But Dr. Landry is irrepressible and will soon be back on the air, meanwhile using his 20-watt auxiliary Radiophone set.

Fans Thank Broadcasters of Democratic Convention

NEW YORK.—As a concluding part of the Democratic convention here, was read a resolution from the listening in public thanking those who contributed toward Radiocasting the proceedings. The resolution was entered upon the official records of the convention and will stand as a marker of the modern invention which has thus changed political procedure.

SET CLOCKS BY AIR, NEW RADIO WRINKLE

RADIO, Va.—Arlington time signals transmitted by Radio every noon and ten p. m. (Eastern time) may soon be adopted to set clocks automatically. A recent experiment in Radio clock setting was successfully performed at the bureau of standards. With the special apparatus any clock may be set twice daily. There is nothing new in setting clocks by wire, but the Radio setting is unique, it is said.

GOVERNMENT OKEHS NEW TYPE OF TRIODE

WASHINGTON.—The government has adopted a new standard tube that has several innovations in its design. While resembling a WD-11 electrically and having a base the same size as a UV-199, its prongs have horizontal spring clips which engage knife-blade contacts in the socket. The filament draws 0.25 ampere at one volt, and the plate stands 60 volts with a grid bias of three volts.

HEAR AS WELL AS SEE MOVIES



Hearing as well as seeing your favorite motion picture stars is one of the marvels brought about by Radiocasts. Film luminaries are now heard from many stations throughout the land. Few programs are complete without one or more silver-sheet favorites. Here is pretty Colleen Moore talking to Radiophans from KHJ, the Times, Los Angeles. P. & A. Photo

Paul Revere Takes His Ride on Airways July 4

CHICAGO.—The spirit of the wars of American history lived again on the evening of July 4 in a song pageant Radiocast over the Sears, Roebuck Agricultural Foundation station, WLS. Practically every other local station marked the day with some sort of special program.

Immediately following the Lullaby hour the Declaration of Independence was read from WLS. A medley of Revolutionary war songs followed, with a few short descriptions of their history. Again Paul Revere took his heroic ride. But this time it was not along the green roadways of Lexington and Concord, but over

the invisible highways of the air that the click of his horses' hoofs broke the silence.

Auto Tourists Bound for Florida Get WSB Advice

ATLANTA, GA.—Road conditions and tour advice for the special benefit of motorists driving to and from Florida is Radiocast every Friday night at 8:30 Central time from WSB, the Atlanta Journal. The service was inaugurated eight months ago by the Atlanta Motor club, which has since found the information so much appreciated as to warrant its regular continuance.

WILL TRY TO RADIO PHOTO OVER OCEAN

EUROPE'S FIRST PICTURE SENT BY AIRWAVE

Frenchman So Successful in Land Test He Will Now Attempt Trans-Atlantic

PARIS.—The first photograph ever transmitted by Radio in Europe was printed recently in the *Matin*. The picture of Gen. Gustave A. Ferrie, director of the Eiffel tower station, was an excellent one, but it bore several vertical smudges, which however, were easily eliminated by retouching.

The picture was sent by the process of Edouard Belin, the inventor of the method of transmitting pictures and photographs by wire. Although the details of the wireless method have not yet been disclosed, it is known that it is on the same method as is used on the wires.

Will Attempt Trans-Atlantic

The first Radio picture sent by M. Belin was from Malmaison, a few miles outside of Paris, to the *Matin* newspaper office. The experiment was so successful that M. Belin declared he was sure transatlantic transmission was quite practicable and will be attempted shortly. A second picture, sent an hour after General Ferrie's had been received, was even clearer than the first.

The experiments of M. Belin in Radio transmission of pictures began in 1912, and the *Matin* in announcing his success today, predicts that "television," or long-distance seeing, will soon be accomplished. Its advantages are said to include not only better reproduction with the elimination of wires, but also far greater speed.

American Inventor in Bad Fix

BIRMINGHAM, ALA.—Alfred Marchant of Mobile, Ala., says that after two years of hard study he has perfected a system by which he can send photographs through the air by Radio.

"I am ready to give a demonstration if I can get the assurance that my secret will be fully protected," Marchant said. Just what to do with the discovery Marchant seems at a loss to know. He realizes without giving a demonstration his discovery is valueless, and should he give a demonstration he is fearful that his secret will leak out, and that he would lose the benefits of his years of work and study.

"It is possible to transfer any photograph through the air by Radio with my invention," Marchant said.

NEW TUBE MAKES DEBUT ON EIFFEL

May Be Taken Apart for Repairs Without Having to Be Pumped Out

PARIS.—A new kind of vacuum tube for use by Radiocasts has recently been perfected in France and is now in use in the great sending station at the Eiffel tower here.

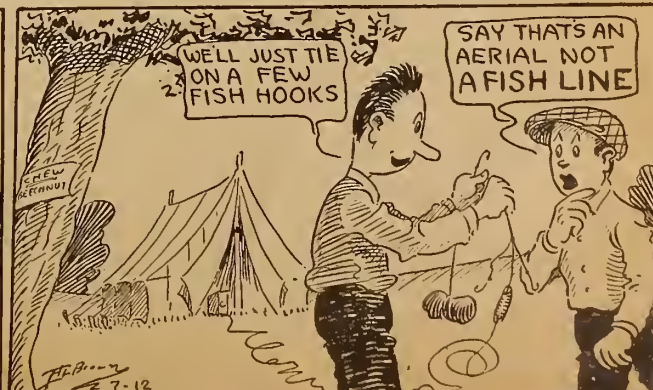
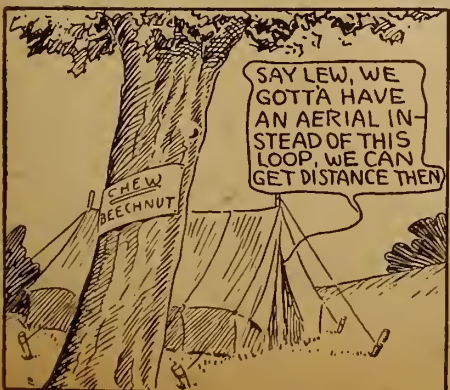
The new tube will come apart any time for repairs and readjustment. It does not have to be pumped out in advance by a vacuum machine. On the contrary, the pump that maintains the necessary vacuum is continually attached to the tube itself. The tube is kept pumped down continually to any desired degree of vacuum—or as the Radiophan says, "hardness."

The new tube was invented by Prof. F. Holweck, a well-known physicist of the Institute de Radium. The first tubes built on the new design had a power of ten kilowatts. More recently a fifteen-kilowatt tube has been built and still larger ones are proposed. The demountable construction of the tube not only permits easy repairs but facilitates the design of the artificial cooling devices that become so necessary with tubes handling large amounts of power.

THE ANTENNA BROTHERS

Spir L. and Lew P.

Part I—New Way to Catch Birds



TAXIS MAY SOON BE FITTED WITH RADIO

DISPATCHERS IN CONTACT WITH ALL CABS

Birmingham to Mark Trial in New Field of Practical Use for Airwaves

BIRMINGHAM, ALA.—Leading taxicab companies of Birmingham may soon equip their cabs with Radio, while some of the even more progressive taxicab companies are contemplating installing Radio sets by means of which their cabs may be dispatched.

W. O. Arzinger, Birmingham Radio engineer, has been working for some months on the design of a transmitting set to be used for dispatching taxicabs and receiving sets to be placed within the cabs. He announces that his preliminary designs are now complete and that they work to perfection.

"With one of these transmitting sets installed in the central taxicab office, and with each taxicab equipped with a receiving set, the central or main office at any time can reach anyone or all of their cabs," Mr. Arzinger said.

Could Reach Passenger in Emergency

"And with the use of these sets, a passenger, has been working for some months station, or on any other occasion, for that matter, may be communicated with," he continued.

Asked if these sets would be very expensive, Mr. Arzinger replied that they would not. "An outfit for the central office will cost something like \$100, while sets for the individual cabs will only cost about \$50 each," he said.

Mr. Arzinger said that at least one taxicab company would install the sets in their cabs before attempting to market the outfits generally. "Since I live in Birmingham and expect to manufacture here, I want the taxicabs of Birmingham to be the very first in all the world to be equipped with Radio," Mr. Arzinger continued.

Monday Opera Talks

CINCINNATI.—Descriptive talks about the operas to be given every Monday evening at the Zoo and broadcast through the Crosley Radiocast WLW, are given the same day at 4:00 p. m. Central time. The description is given by Mrs. Fred Smith, wife of the studio director of WLW.

SUPER-HETERODYNE IS AUTO COMPANION



A super-het is companion to Miss Mary Moor, New York City, while she tours the East by automobile. P. & A. Photo

WBAP Eliminates Evening Concerts Until September

FORT WORTH, TEX.—WBAP, the Star-Telegram, Radiocast here, has started its summer vacation on night musical concerts, which will continue until September 15. While the night concerts are temporarily discontinued, a special noon-day concert will be inaugurated. It has been found that during Texas summers, musical reception is much better in mid-day than at night. The usual hourly market service and the four evening periods devoted to baseball, will be continued. Distant listeners have been unanimous in their acclaim of WBAP'S summer reach.

CROSLEY

Announcing — The New Models — each a leader in its line



Crosley Trirdyn 3R3, \$65.00



Crosley Trirdyn 3R3 Special, \$75.00



Crosley 51, \$18.50



Crosley 51-P Portable, \$25.00



Crosley 52, \$30.00



Crosley 51-A, \$14.00



Crosley 50, \$14.50



Crosley 50-A, \$18.00

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CROSLEY 50. A new one tube Armstrong Regenerative Receiver. We believe this to be the most efficient one tube receiver ever put on the market. Uses any standard storage battery or dry cell vacuum tube.....**Price \$14.50**

CROSLEY 50-A. A new two stage Audio Frequency Amplifier to match the new Model 50 Receiver. When used in connection with the Crosley Model 50 Receiver, it gives the equivalent of a three tube regenerative receiver. Long range on loud speaker.....**Price \$18.00**

CROSLEY 51. In twenty-four days this receiver became the biggest selling radio receiving set in the world and it holds that position today. It uses two standard storage battery or dry cell tubes, regenerative detector and one stage of audio frequency amplification. Will bring in local stations on the loud speaker at all times, and under average conditions will also bring in distant stations on the loud speaker**Price \$18.50**

CROSLEY 51-A. A new one stage Audio Frequency Amplifier to match the Model 51 Receiver. Combined they give the equivalent of a three tube receiver. Long range on loud speaker.....**Price \$14.00**

CROSLEY 52. A new three tube Armstrong Regenerative Receiver. It is unusually efficient, will provide loud speaker volume on distant stations under practically all conditions, and is in every way an ideal receiver for the home. Extra phone jack to plug in on two tubes.....**Price \$30.00**

CROSLEY 51-P. This is our new portable set. It is the Crosley Model 51 two tube receiver mounted in a leatherette covered carrying case, battery space and all self-contained. Convenient for home or traveling.....**Price \$25.00**

CROSLEY TRIRDYN 3R3. This three tube receiver gives the efficiency and volume of a five tube receiver. Incorporating Radio Frequency Amplification, Regenerative Detector with one stage of Reflexed and one stage of straight Audio Frequency Amplification. Can be calibrated accurately—stations logged and returned to at will. Used on outdoor or short indoor antenna and is, we believe, the most efficient and sharpest tuning receiver on the market at any price for bringing in long distance stations. Received country-wide approval of radio experts....**Price \$65.00**

CROSLEY TRIRDYN 3R3 SPECIAL. This receiver is exactly the same as the Trirdyn 3R3 except the solid mahogany cabinet is larger to contain accessories and "A" and "B" Batteries required when standard dry cell tubes are used.....**Price \$75.00**

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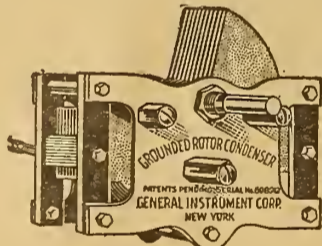
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Because actual tests have proved that dielectric losses have been practically eliminated. This makes it possible for your receiving set to surprise you with a new power.

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A Professor of Radio Engineering in instructing his pupils said that to attain results such as no other variable condenser will produce you must use the Low Loss General Instrument

Grounded Rotor Condenser.

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Type 46A	13	6	.0003	4.50
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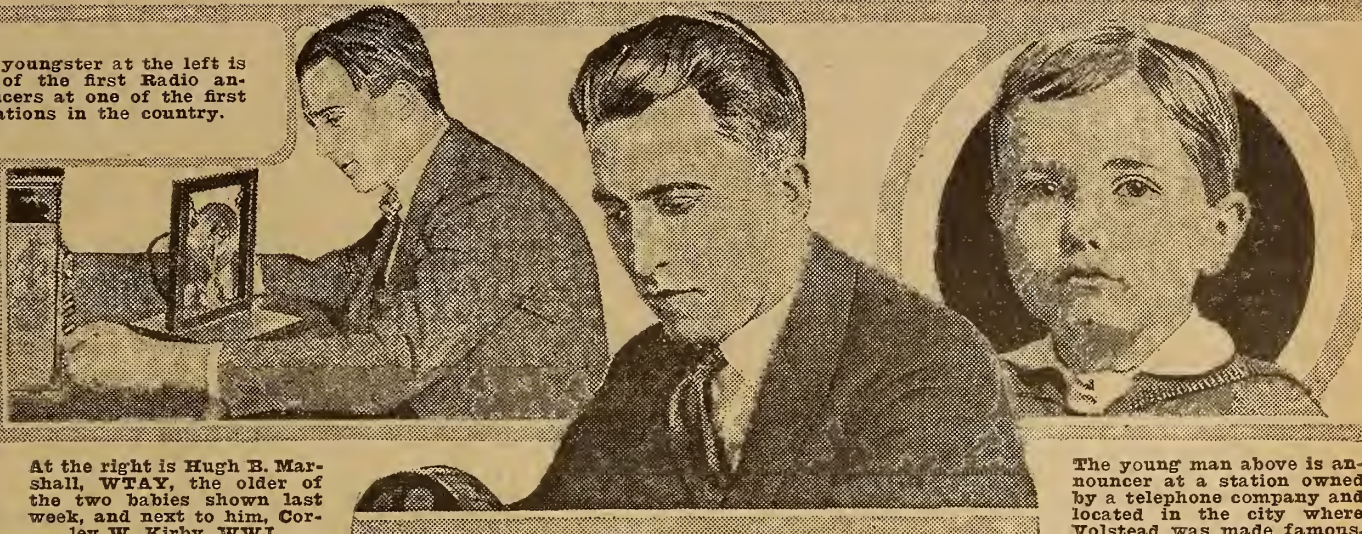
423 Broome Street
NEW YORK CITY



BEFORE THEY THOUGHT OF "MIKES"



The youngster at the left is one of the first Radio announcers at one of the first stations in the country.



At the right is Hugh B. Marshall, WTAY, the older of the two babies shown last week, and next to him, Corley W. Kirby, WWJ.

The young man above is announcer at a station owned by a telephone company and located in the city where Volstead was made famous.

Hugh B. Marshall, WTAY

BORN in a town called LaCrosse, Wisconsin, in 1897; and living there until 1918, sure is some record for an announcer. No big town stuff until his Uncle Sam decided that he needed a few good men in the army, and then according to Hugh—"he looked at me." Being somewhat of an impersonator, he did his stuff for the boys in the army in the fall of 1918. Whether it was because of his good work or not, we have been unable to determine, but they decided to finish the war and let him make some money. He signed up with the Red Path Chautauqua and started a jaunt covering 32 states; then he decided that the home ties were calling and returned to La Crosse, thence to school to study dentistry. It was while he was performing in Chautauqua that he met his wife—yeh! he's married has been for four years. She was sitting in the audience at Akron, Iowa, and wouldn't even smile at his wise cracks. But, she laughed two years later—wedding bells and slow music, you know how it is.

His hobby is "flivvers"—taking them apart and putting them together again; profession, recent dentistry graduate of Northwestern university, intends to open up office and practice in August in Oak Park; ambition, "to be an ethical dentist;" aversion, second hand Fords and an old maid looking for a husband; gifts from fans, box of cough drops and a faded, withered, badly dilapidated rose—the last rose of summer. Last summer he started at Station WJAZ as studio manager but long hours forced him to give it up because of school. When WTAY started in February, 1924; he filled the position of manager and announcer. His creed as an announcer is: "A little humor, here and there, if not too long—make announcements different." **Corley W. Kirby, WWJ** THIS young man has so trained his voice that his wife doesn't know whether he is announcing, or his "side-kick," Edwin L. Tyson. This outstanding feature is exceptionally useful

when he desires a night off to go to the club. It is his misfortune to have to carry around the given name of Corley hooked up with a perfectly good Irish christian name of Kirby. He was born in the latter part of the nineteenth century, to be exact, 1896, in a little town called Peoria, which appears only on country maps. Of course, he was educated in his home state, Illinois. His eyes are brown and hair is akin to that color. Sometimes it is combed, and sometimes it isn't, largely because he has the unhappy faculty of musing it up when in a pensive mood. Gifts from admirers cover a large variety; sometimes it is a piece of wedding cake, another time it is flowers, and again it may

be cigars or cigarettes. His old standby is his pipe, which perhaps is the most delapidated looking pipe in the city. It has had years of service and speaks for itself, with no weak accents, either. Tennis is the predominating sport at the present time, although he enjoys baseball and football. His height is five feet ten inches, and comes in very handy in playing tennis. As for vices, of course he has them, just the average quantity for a man of his age, not too good and not too bad. Being an old newspaper man, he is a bearcat when it comes to correct pronunciation and enunciation, and he firmly believes that every announcer should be careful just what he says and how he says it to the listening public.

New Towers, Antenna Raise WDAF'S Power

Fans' Letters Show Volume of Signals Greatly Increased

KANSAS CITY, MO.—According to hundreds of letters received by The Kansas City Star, the new 160-foot towers with the new antenna erected on top of The Star building greatly increase the volume of the signals. There has been a slight drop in radiation, but this probably will not decrease the distance of the station. The towers are a part of the entire new equipment to be installed by WDAF. Other new parts will include a larger studio and operating room, and a new transmitter. Work on these improvements has not yet begun but is expected to start soon. Happenings of the Shrine convention in this city, the Republican convention in Cleveland, and the Democratic convention in New York have been transmitted to listeners over this new antenna and thousands of letters are pouring in congratulating WDAF on the volume and clarity of everything. The towers are of massive steel, painted a battleship gray, and stand 160 feet on top of the building which is 85 feet in height.

Destroy German Station

BERLIN.—An attempt was made recently to destroy the great Radio station at Koenigswueterhausen. One mast was actually brought down.

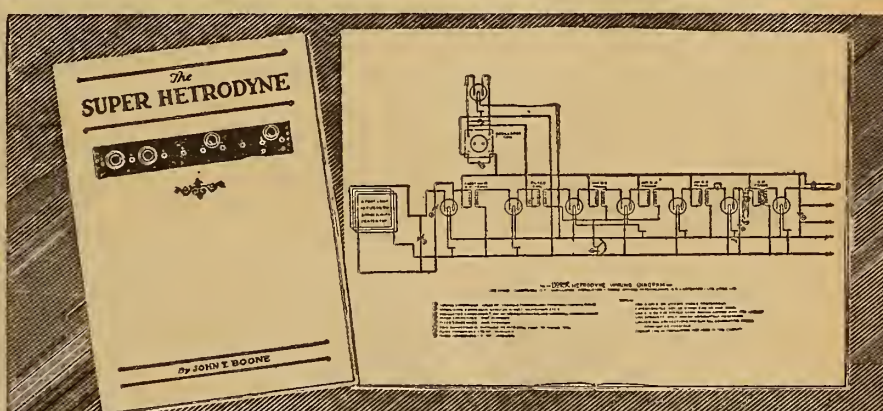
'Largest Spark Coil' Is Source of 'Death Ray'

English Chemist Says All He Needs Is Bike Lamp

LONDON.—Two weeks ago it was announced that nearly every European power had at least one death ray inventor. Now England has been stricken with another. The last arrival on the scene is a chemist, but evidently his ray is based on electrical phenomena for he claims to have the largest privately owned spark coil in the world. It is from this that he gets his ray. He maintains, however, that he can direct his death-dealing ray along a beam from a bicycle lamp or even a pocket flash-lamp. With a common searchlight beam he claims that he could wreck a Zeppelin in no time. The claims of the many inventors are attracting but little attention in official circles. However, serious consideration is being given to the development of the two plans suggested by well-known and successful scientists; the plan of Grindell-Matthews (the first one proposed) and the plan of Professor Wall of Sheffield university.

Hoover Meet in September

WASHINGTON, D. C.—No official announcement has been made at the department of commerce relative to the date for the third Radio conference. Secretary of Commerce Hoover has let it be known unofficially, however, that he will call the conference for the latter part of September.



Every Radio Fan Needs This Book

A Complete Text Book on Super-Hetrodynes

Here for the first time is a thoroughly scientific volume treating of what the super-hetrodyne means to radio, together with a wealth of data on its development, advantages and operation. Written by a man who was a pioneer in the development of radio, this book covers the entire field of super-hetrodyne equipment. Profusely illustrated, and liberally supplied with charts and wiring diagrams, this book gives you a fund of information found nowhere else. The price is \$1.00 postpaid. Order today. Use coupon below.

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- BOONE SUPER-HETRODYNE TRANSFORMER KIT—This set contains 1 Short Wave R. F. Transformer, 1 Oscillator Coil, 1 Filter Coil or Input Transformer, which is carefully balanced with the 3 Long Wave R. F. Transformers, 1 Audio Frequency Transformer, Wiring Diagrams and Instructions. Price \$50.00.
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Announcers' Contest

Radio Digest First Annual GOLD CUP AWARD

GOLD CUP AWARD Editor, Radio Digest, 510 N. Dearborn St., Chicago, Ill.

Dear Sir:

I nominate

Station and Call.....

Signed

Address

Town State.....

NEW UNIDYNE RECEIVER

(Continued from page 1)

such tubes have been confined only to the laboratories of a very few large firms who have offered little information relative to any experimental work they may have carried on. This possibly may be explained by the fact that the sale of three electrode tubes has been very profitable so why detract from same by introducing a few more new tubes that would require

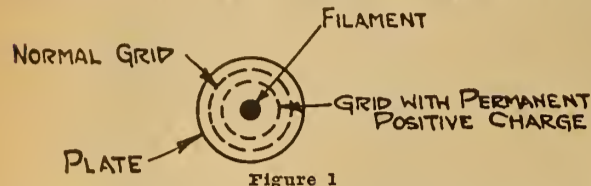


Figure 1

expensive machinery for production, and other numerous items which would materially effect the profits of the year.

The Fourth Electrode

The effect of the third electrode or grid in the vacuum tube has been repeatedly described so that all should be well acquainted with it.

If, as shown in Figure 1, the inner grid around the filament is positively charged by connecting it to the positive terminal of the filament battery it accomplishes the same thing as increased filament heat would, namely accelerate the departure of electrons from the filament. The result is a more pronounced flow of electrons to the plate. From tube curves it is known that increasing the positive potential on the grid has the same effect on the plate flow as increasing the plate battery. Another way of saying it would be that the equivalent internal resistance of the plate circuit has been reduced.

This first inner grid then simply becomes an accessory to the filament in providing an increased flow of electrons. The second or outer grid performs the same functions as the grid in the normal three electrode tube, that is, as the incoming oscillations change from positive to negative, it assists or resists the flow of electrons to the plate.

What Amplification Depends On

It is obvious that this increased flow of electrons from the filament through the use of the extra or inner grid is equivalent to the same increase through use of plate batteries, hence there should be no difference in tube life. The suggestion might be made that by using a plate battery in addition, an even greater plate flow will result. Depending on the characteristics of these new tubes, this may be true, but it must be remembered that

the amplification power of a tube depends on the effect of the normal grid on this plate current. Regardless of how great this plate current may be, the variations in the potential of the normal grid will be no different from the usual tube and hence the plate current fluctuations correspond closely to those in the present tubes in use. It must be kept in mind that the purpose of this tube and its circuits is primarily to eliminate the necessity of the B battery. Research will undoubtedly create further development which as yet are unthought of.

Unidyne Circuit

The circuit used in conjunction with this four electrode tube is shown in Figure 2. On examination, the circuit will appear normal with the exception of three points. 1—The extra grid. 2—No B battery. 3—The transformer. The extra grid is the one connected to the positive A battery lead. The plate circuit runs from the plate of the tube, through the tickler coil, then through the primary of the transformer, through the receivers and back to the filament circuit. The secondary of this ten to one ratio transformer connects on one side to this inner grid and the other side to the plate

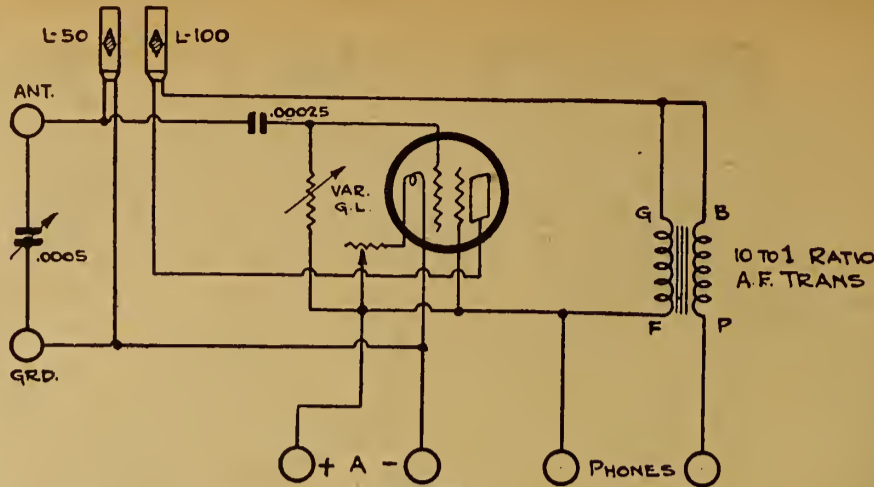


Figure 2

circuit. The theory of this transformer is, producing what might be called an additional regenerative feature. Undoubtedly this makes the circuit very difficult to control because in further circuits the flow which is fed back into the inner grid

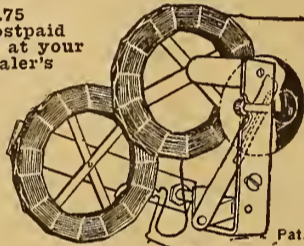
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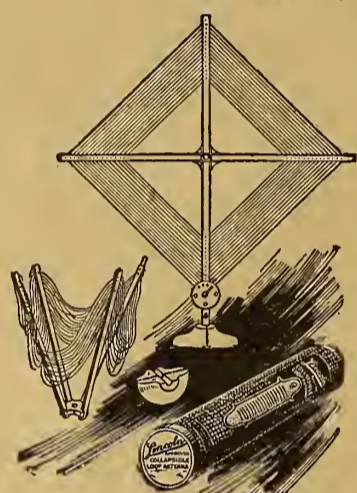


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Great selectivity—no static—quality reception



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Lincoln Collapsible Loops offer many advantages, appreciated by Radio Engineers and Radio enthusiasts.

Wave length range with 23 plate condenser is 160 to 600 meters.

H. F. Resistance at 400 meters—only 7 ohms.

Wire is stranded, flexible and of great tensile strength and high conductivity. Inductance .2 millihenry.

At your dealers. Tapped Loop \$8.00 Without taps \$6.50

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THE first practical, workable solution of the problem of radiation from regenerative receivers. Unlike the "wave-trap" it increases signal intensity.



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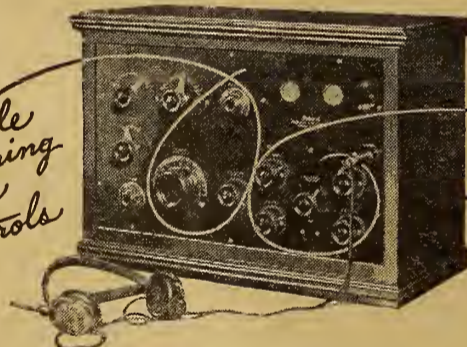
- Increases Selectivity
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Simple Tuning
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These to produce exceptional tone refinements

IT HAS been the tradition of the Federal Company, over its 25 years in manufacturing Electrical Communication Equipment, that it must give its users the highest refinements of the art.

Federal tradition will not permit the manufacture of a radio set just for radio noises. Each and every manufacturing necessity to produce a harmonious set is known to Federal Engineers, and no Federal set is produced without them.

Federal radio sets are built with two thoughts in mind—first: simplicity of operation, but three controls being necessary—second: special controls for refinement if the user is interested in reproducing all the beauty of tones that fill the air.

"Lovers of good music" know why Federal is better, and know the real value of the refinement placed at their command to make it easy to obtain the clearest tone reception.

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Summertime Operating and Trouble Shooting

Hints Covering All Makes of Sets

By Harry J. Marx

DURING these warmer months when the aerial artillery seems to be continually in action, the problem of successful operation of a receiving set assumes decidedly greater importance than ever before. There are however, quite a few little kinks in operation and tuning, which, when properly applied, will be of considerable value in obtaining very satisfactory reception.

The Antenna

If during the winter months you found that your long antenna gave you lots of volume and permitted the best long distance reception, better get acquainted with the fact that in the summer time that same antenna makes a decidedly efficient collector of interference. Fans have already discovered that 25 to 50 feet gives good results in warmer weather with a decided reduction in the interference that accompanies all out of town stations.

If, however, you decide to put up an extra wire of shorter length for summer time use, don't run it close to and parallel to your long distance antenna. Why? Well your long antenna will pick up signal and interference as before and pass it on to the small antenna by induction unless the wires are sufficiently far apart and not parallel. Likewise don't keep two lead-ins close together coming down into the room where the set is located because exactly the same thing may happen there.

Unless you have enough stages of Radio frequency don't try loop aerial reception. The chances are against your getting much reception. A loop aerial necessitates two stages of Radio frequency amplification for satisfactory operation on any out of town stations.

Static Eliminators

The so-called static eliminators seem to sound good in news stories but somehow or other a real practical one hasn't appeared on the market up to the present time. It is peculiar how their merits are extolled during the winter weather but as soon as summer is with us the static eliminator has vanished. The best type of static eliminator is the fan who carefully watches all those little points in the proper operation of his set and who therefore gets the best possible

signals. His results always make the other fellow think there's a nigger in the woodpile! A little less volume without noise is better than a street corner bellow with a machine gun background.

Efficiency of Receiving Set

In cold weather, when volume is good and reception is clear, little attention is paid to a number of little noises in the receiving set, such as battery noises, tube noises, audio amplifier whistles, ground hum, scratching and crackling from poor connections and even loud speaker troubles. But during warmer weather all these help to build up the level of interference to the detriment of good reception.

Run Down Batteries

Both plate and filament batteries when run down develop additional resistances in the circuit which is also the cause of crackling discharges in reception. For this reason more care should be taken during hot weather to see that these sources of current are always in the best of condition.

Poor joints in the wiring of your set, especially due to careless soldering, are the causes of poor electrical connections which are often indicated by irregular and very noisy reception. Careful attention to each soldered joint would improve the efficiency of many a condemned Radio set.

The elimination of noisy tubes is of more importance now than ever before. Soft tubes appear to have a larger proportionate number of offenders than the hard amplifiers. Many of the A type tubes have a bad habit of softening under continued use or high plate voltages and then soon become very noisy in operation. Just borrow a few tubes some time and find out a little more about the tubes in your set.

Ground Hum

Ground hum is an especially annoying source of discomfort nowadays. It may be due to a number of things such as run down A batteries, wrong rheostat adjustments, poor grid leak, improper tuning, interference from power line, proximity to some form of generator of electrical oscillations, flashing signs or

imperfections in the tuning apparatus. It requires considerable patience to trace down the sources of trouble but it can be done.

Cheap or defective audio frequency transformers will often introduce a whistle in reception. Occasionally it is quite distinct and piercing while often it is just audible in the background of reception. There are two or three methods of combating this trouble outside of replacing the transformers. Grounding the metal cores or shields of the transformers; connecting a small fixed condenser (.00025 to .002 mfd.) across various terminals of the transformer, or across the variable grid leak. One of these methods will usually eliminate the trouble.

Filament control jacks and even the other types of jacks occasionally start trouble due to imperfect contact between springs. It may be necessary to sandpaper the contact points or possibly to slightly bend the springs so as to increase the contact pressure.

Trouble With Phone Plugs

Phone plugs sometimes become wet or dirty and cause trouble in reception. Loud speakers sometimes go on a strike and

it is often that diaphragms develop cracks that produce cracking sounds when in operation. Occasionally the writer has to take apart the loud speaker because some thoughtless friend thought the horn was an ash receptacle.

Fixed condensers are big factors in improving a reception, but with the inaccuracy and poor quality of the numerous cheaper grades on the market they do much toward spoiling your set. Be wise and buy the best.

Grid Leaks

Poor quality grid leaks or improper adjustment of variable grid leaks will develop anything from a shrill pitched whistle to intermittent choking of reception. Fixed grid leaks vary considerably from the marked ratings, especially during warm and moist weather conditions. Moisture collecting on grid leaks reduces the resistance to a marked degree. Watch your grid leaks.

Very few people realize the importance of good contact in tube sockets. This problem of contact of springs with the tube prongs is of especial importance in Radio frequency stages. Checking this over in your set will help solve some of your troubles.

WD-11



Radiotron WD-11 is famous as the tube that really made possible the swift growth of radio in the home, as we know it today.

Inexpensive to operate—using but one 1½-volt dry cell—doing away with the need for storage batteries—it has lowered the cost of Radio.

Price \$5.00



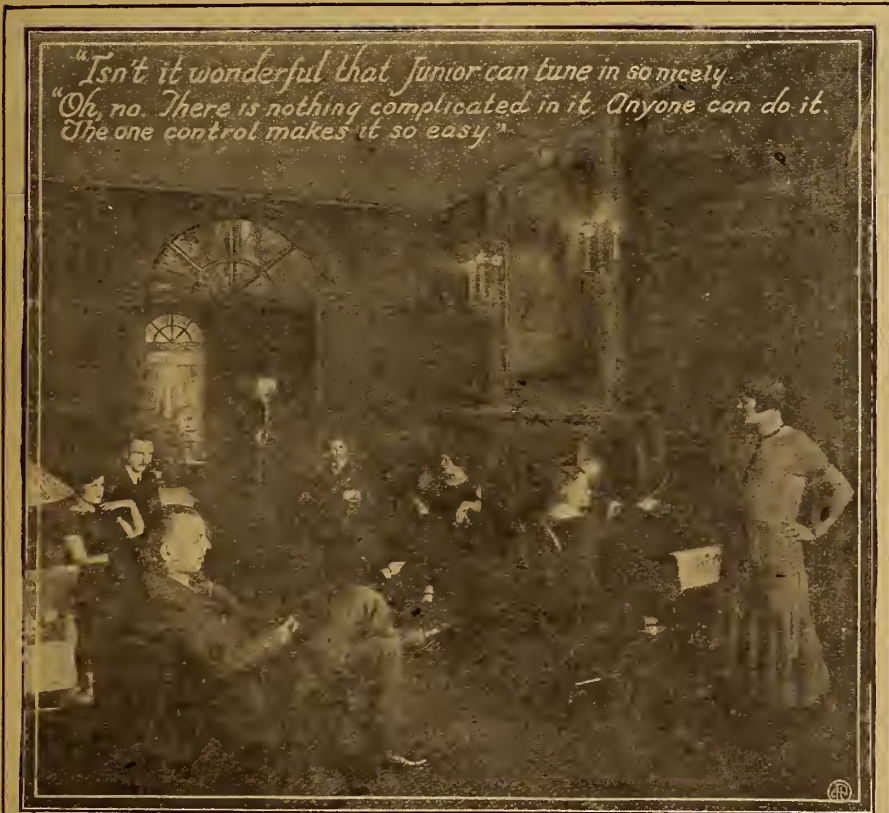
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*"Isn't it wonderful that Junior can tune in so nicely.
 "Oh, no. There is nothing complicated in it. Anyone can do it.
 The one control makes it so easy."*

Bristol Single Control Radio Receiver

Complicated combinations are eliminated when tuning in with Bristol Single Control Radio Receiver—every station is on the one dial. It gives the joys of radio with technicalities left out.

The well-known Grimes Inverse Duplex System (non reradiating) is utilized in this Receiving Set. Because of the reflex, only four tubes are required to give power equivalent to six. The price, without accessories, \$190.00.

Audiophone Loud Speaker

You forget the radio equipment when listening thru the Audiophone Loud Speaker. The tone is full, clear and pleasing. It gives a true reproduction of the original. Made in three models—Senior \$30.00, Junior \$22.50, and Baby \$12.50.

Ask for Bulletins Nos. 3014 and Ay-3015

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No. 23 of a Series Featuring Experiences of "ALL-AMERICAN" Users

All-Americans Improved My Set 100%

By Hans Erbs, Chicago

"As I am a radio fan and get the Radio Digest every week, I saw in it that a fellow from British Columbia—using All-American Transformers—got Kansas City, about 1700 miles. (now WEBB) the powerful local Radio Digest every week, I saw in it that a fellow from British Columbia—using All-American Transformers—got Kansas City, about 1700 miles. I picked up KGO, Oakland, Cal., on the loud speaker and held them 'til they signed off at 12:10, Chicago time.

"I had been unable to get more than about 500 miles on my three-tube set, so last Saturday I bought two All-American Transformers, 10:1 and 3:1 and put them in, in place of two I had.

"Monday I picked up WKY, Oklahoma City, Okla. Tuesday, March 18th, at 10 p. m.—just as KYW, WDAP and WJAZ



All-American Audio Frequency Transformers. Come in three ratios: 3:1, \$4.50; 5:1, 10:1, \$4.75. The best—no necessity to pay more.

"I think that is a little better than the other fellow. All-Americans improved my set one hundred per cent."

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AMPLIFYING TRANSFORMERS

Largest Selling Transformers in the World

ENGLAND PROMISES ETHER MOVIES SOON

RADIOPHANS "HEAR" PICTURES IN LONDON

J. L. Baird's Scheme Uses Disks Similar to That of C. Frances Jenkins Device in America

LONDON.—British Radio movie specialists are experimenting in the transmission of motion pictures by Radio, as is also C. Frances Jenkins in America.

Broadcast listeners around London have "heard" moving pictures by Radio many times, but few fans, if any, have seen them, because they are not possessed of the proper receiving apparatus. All the listeners heard was a high-pitched, intermittent whistle.

Recently a Radio device capable of transmitting motion pictures which can be received on tube sets, similarly to music and speeches, was tested by the

inventor, J. L. Baird, operating from a south coast town in England.

The transmission apparatus is said to be simple, the object to be transmitted being placed in a beam of light before a rotating, perforated disk. Rays of light then pass through a second rotating disk, and are received on a selenium cell. They are then translated into an electric current.

How Movie Receivers Operate

Receiving sets will be equipped with another rotating disk equipped with a ring of electric lights arranged in positions corresponding to the holes in the disk of the transmitter. As the disk revolves rapidly, the lamps are lighted by the incoming signals.

Earlier experiments in television transmitted a sharp image, but it was subject to flickering. This difficulty has now been overcome, it is understood, through the employment of the revolving disk, and a picture similar to a brush drawing is reproduced at the receiving end.

"A cinema picture can be transmitted so faithfully that every movement is reproduced," the inventor states. To insure the dual operation of both the transmitting and receiving disks at exactly the

same speed, a Radio wave is sent out by the transmitter which is used to regulate the speed of the receiving motor.

WHN Serializes a Drama, Part a Day for Six Days

NEW YORK.—Serializing a play from the legitimate stage was recently accomplished by Radiocast WHN here to overcome difficulties in installing a direct wire to the Princess theater.

The play at the Princess was "The Wonderful Visit," by H. G. Wells, and its serialization at the WHN studio took six days, devoting from ten to twenty minutes each time. This is believed to be the first time a Radario has been serialized.

Radio in Portugal Now

WASHINGTON, D. C.—Authority to install and operate Radio apparatus in Portugal has been given by a recent decree of the Portuguese government. Until this action was taken no legal right existed whereby amateurs could install receivers.

NEW UNIDYNE RECEIVER

(Continued from page 6)

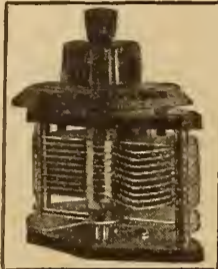
transformer is omitted. The values of the component parts used are given in the diagram and as will be noticed are the same as in any of our own circuits for the usual Radiocast reception.

In the continuation of this article, details of an amplifier circuit and also a two-tube receiver will be described.
(TO BE CONTINUED)

Hears 586 Radiocasts on 3-Tube Set; Claims Record

ALEDO, ILL.—Glen Peterson, of this city, claims the world's record for Radiocast reception. He has, he says, heard 586 stations on his three-tube set.

The finance ministry, in accordance with authority recently granted, has entered into a contract with the Danish Radio Company, Limited, for the erection of four Radio stations in Greenland.



Plain type 3-plate \$1.25, 5-plate \$1.50, 13-plate \$2, 17-plate \$2.50, 23-plate \$2.75, 43-plate \$3, at dealers.

Vernier type: 13-plate \$4, 23-plate \$4.50, 43-plate \$5.50, at dealers'.

WALNART VARIABLE CONDENSERS

They're trouble-proof! Each condenser carefully inspected and given an electrical "breakdown" test before leaving factory. Plates accurately spaced, pressed and everlastingly locked in Bakelite end plates—can't "cut out" or develop looseness as when spaced by wearable washers, solder, etc. Used by the thousands in many leading sets. Ask your dealer first, please. Booklet on request.

"Makers of good goods only"
WALNART ELECTRIC MFG. CO.
Dept. 443 CHICAGO

AROUND THE WORLD

A New Zealand amateur got Alabama (10,000 miles) on one Myers Tube—heard the signals and message perfectly. Certified by Radio News.

This remarkable performance indicates that there is no limit to long-distance reception with Myers Tubes because their design is right.

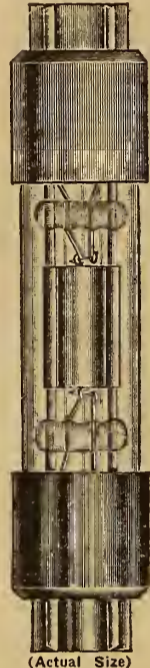
Myers Tubes

Practically Unbreakable

add to the efficiency of any set by cutting out noise, tube hiss and interference.

Two types: Dry Battery and Universal (for storage battery). Write for free circuit diagrams.

Insist on the New Improved Myers Tubes—at reliable dealers—otherwise send purchase price and be supplied postpaid.



(Actual Size)

\$5 EACH Complete with clips ready to mount on your set; no sockets or other equipment necessary.

E. B. Myers Co. Ltd.
Radio Vacuum Tubes
240 CRAIG ST., W.
Montreal, Canada

READ WHAT Big Editors Say!

The Boston Traveler—This three-coil hook-up provides a combination sensitive, selective and, above all, flexible.

Philadelphia Public Ledger—The hook-up that gives long distance, sharp tuning, low cost, volume.

New York Evening Mail—A receiver of this type will do everything that the triple honeycomb receiver, the old standby, can do, and more.

Pittsburgh Post—The set will be found remarkably selective, free from objectionable noises and easy to control.

The set is shipped completely mounted, requiring nothing but simple wiring by our special blue print provided, and is ready to operate in less than an hour. The compact arrangement of instruments is more ingenious than any set ever offered by anyone. Every part is standard goods—high quality throughout.

It is a real masterpiece, and looks it. You will enthusiastically agree when you see it.

SPECIAL PURCHASE
For Our Nation-Wide Friends
FADA 160 SETS
Genuine Factory Built
with Serial Numbers
List \$120 **\$81**
SPECIAL

SET CONSISTS OF
1 DRILLED 7 x 10 Radion Mahogany Panel, engraved in Gold.
1 Genuine Ambassador Master 3-Circuit Litzendracht Tuning Coil.
1 Genuine Comsco Bakelite-End Condenser.
1 Triploid Mounting Socket.
2 Premier Heghog Audio Transformers
4 Brunswick Under-slung Foundation Brackets.
2 Brunswick Jacks with Gold-Plated Fronts; 1 for phones; 1 for loud speaker.
1 Freshman Micca Grid Condenser.
1 Standard Glass-Enclosed Grid Leak.
2 30-Ohm Shackton Bakelite Rheostats.
2 Moulded Mahogany Dials grained to match panel.
5 Lengths Professional Round Bus-Bar.
1 Set of 7 Moulded Engraved Binding Posts completely mounted.
1 Special Blue Print for this circuit. Not an ordinary hook-up, but in clear picture form child can understand and make. Assembled ready to wire, and packed in handsome box, complete. Only \$27.95 C. O. D. Send no money.

Scoring Committee of Philadelphia, Pa., hears 49 stations from Cuba to Los Angeles sign off in 8 1/2 hours.

Wins Competitive Distant Test of "New York Evening World." The only PERFECT score.

ACCESSORIES
Everything needed to operate after building is listed here—
3 Type 201-A Tested Tubes\$11.70
1 60-Ampere Hour Storage Battery\$11.25
2 45-Volt Extra Large Enco "B" Batteries\$6.50
1 pr. 3000-ohm Head Phones and Cord\$3.75
1 Phone Plug, Double\$.90
1 Antenna Equipment\$1.50
Complete outfit, \$35.60 (Parts Also Sold Separately)

SPLENDID FREE CABINET
Order Building Kit and Accessory Outfit both together, and we will send Fine Mahogany Finish Cabinet FREE.

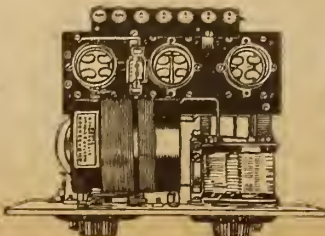
SHIPPED TO YOU AS A COMPLETE 3-TUBE ASSEMBLY ALL READY TO WIRE All Mounted as Picture Shows Below

THE NEW DE LUXE AMBASSADOR MAKES NEW RECORD



\$27.95

C. O. D. Send No Money



London, England, (2LO) Broadcast checked by radio editors of "Philadelphia Inquirer" heard loud and clear.

50 stations calibrated between points 10 and 89 on condenser dial; 9 between 14 and 20; 11 between 41 and 48. Then logged daily on same points.

PLEASE REPORT YOUR RESULTS

Fits Snugly Behind a 7x10 PANEL
We also have a **SUIT CASE CABINET**

Space for set, "A" and "B" Batteries and Antenna. Covered with fine automobile leather Fabricoid, re-inforced corners, handle, special convenient doors. A truly elegant, high-class affair that you will delight to own. Additional—

\$12.00

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SEND NO MONEY

We ship C. O. D. Pay your postman. Then enjoy your set under our WRITTEN Money-Back Guarantee sent with shipment. We acknowledge all orders by return mail. Ship same on following day. We answer every letter we get on same day. The Radio Shack are the Largest Radio Dealers in America. No inferior goods. Only the best and most reliable. You buy in safety. Send your C. O. D. order today. Use the coupon NOW.

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Free Illustrated Circular of "De Luxe Ambassador" Here X
Mark X here ONLY if you want DL Amb. Set \$27.95.
Mark X here ONLY if you want ALL additional accessories.
Mark X here if you want SUIT CASE Cabinet, \$12.00.
If I have marked a cross in UPPER square at left send the De Luxe Ambassador, \$27.95, C. O. D. If I have marked a cross in CENTER square send Complete outfit of Operating Accessories, \$35.60, C. O. D. If I have marked a cross in LOWER square send Suit Case Cabinet, \$12.00. Send mahogany finish CABINET FREE if I have ordered set and complete accessories together. Everything ordered is subject to your WRITTEN Money-Back Guarantee.
Name (Print Plain)
Address

STARS FEATURE WEEK'S PROGRAMS

roadcast

WHN,
WMAQ,

WBAP,
WJZ,

WGR,
WOS,

KY W,
WGY,
WLAG,

Publications,
Church of the
m., Western

10:45 p. m.,
pastor of the
chapel service,
Neb.

a. m., sacred
orchestra; 8,
radio orchestra.
light, 509), 10
Sunday school,

9), 8 p. m.,
Missouri State

), 8-10 p. m.,
den orchestra;
ecker, soprano;
anist.

p. m., Schme-
; 7:30, services

July 14

NF, KFSG, KGW, KYW,
VGI, WGR, WHAS, WIP,
OR, WOS, WQJ, WRC,

tern, Daylight, 425), 1:45
luncheon concert; 4:15,

Pacific, 469), 8-9 p. m.,
), Examiner concert; 10-11,
orchestra.

c, 455), 8:30 p. m., musi-

, 312), 4-5:30 p. m., Hotel
; 8, educational program.
492), 3:30 p. m., literary
association; 8-10, Miller's

(Pacific, 395), 12:30-1:15
and Rendezvous Ballroom
; 8-10, de luxe concert.

rn, Daylight, 270), 5-5:30
Diary of Snubs our dog;
ballad singer.

(Central, 417), 12:30-1:30
d soloist; 9:30-11:30, con-
ey, reader; Lucille Frank-

estern, 423), Ha Lorbach

tral, 345), 8 p. m., male
outer and Mason; Jasper
fason, trombonist; Erwin
D. Inman, soprano; Edith
Elroy, pianist; Mrs. Eva

(Central, 411), 3:30-4:30
; 5-5:30, weekly Boy Scout
City council; 6-7, school

number on the Duo-Art;
ly "Request Story Night,"
ic, Carl Norberg's Planta-
s radio orchestra with the

m-1 a. m., Nighthawk
ood Beach orchestra.

(Eastern, Daylight, 395),
; 12:02 p. m., organ re-
30, Arcadia cafe concert

concert orchestra; 4:30,
30, Dream Daddy's bed-
ld Abbott; 10:30, Arcadia

Eastern, Daylight, 492), 4-
soprano; 4:30-5, Women's
s of America; 6-7, dinner

el; 8:30-10, Marine band
-10:15, Adam Carroll and

476), 12:30-1 p. m., "The
Boon; 8:30-9:30, W. B.
orchestra.

n, Daylight, 319), 12:30-1
hard, organist; 6:30-7:30,
ress, "Selling Yourself,"

3; 8:15-9, Murray White-
birds; 9-11, concert, (classi-
scher, soprano.

(Eastern, 380), 1 p. m.,
Control of Potato Diseases
E. Barrus; 7:30, "High

lection of Poetry," Prof.
mental program pupils of
Austin Springer, director;

nda Noble, soprano; talk,
ean Boy magazine.

al, 400), 4-5 p. m., Alamo
Quinlan's Golden Derby

n, 380), 9 p. m., Edward

tern, Daylight, 405), 2:15-
and his entertainers; 2:45-
oser; 3-3:30, Harry Hoek

ard Partridge's Mayflower
mae festive board; 7:45,
tion, Fisher; 7:30-8, Rose-

0, people's concert, Marcia
destain, jazz pianist; 8:45-
gers; 9-9:30, Chas. Strick-

chestra; 10-11, Jack Shack

tern, Daylight, 509), 1:05
"What the Wild Waves are

Philharmonic orchestra;
o, Walter Perella, clarinet;

lance orchestra; 7, Uncle

Paul, Minn. (Central, 417),
household hints; 11:35-12 m., sur-

0-2:10, woman's club hour,
Myrtle Saperston; 2:40-4, matinee

program; 4-4:30, magazine reading; 6-7 p. m., dinner
hour concert, Geo. Osborn's Nicolett Hotel orchestra;

7:30-8:15, farm lectures.
WLW, Cincinnati, Ohio (Central, Daylight, 423), 4
p. m., opera talks; 8, grand opera, Cincinnati Summer
opera season, Ralph Lyford, director; Music Market.

WMAQ, Chicago, Ill. (Central, Daylight, 447.5), 6 p. m.,
Chicago Theater organ; 6:30, Hotel LaSalle orchestra.

WOAW, Omaha, Neb. (Central, 526), 6 p. m., special
half hour; 6:30-7:30, dinner program, Randall's Road
(Continued on page 12)

WGY,
WGY
ayers;
e, one-
WDAR,
nough
ers.

KFNF, Shenandoah, Ia. (Central, 266), 7:30 p. m.,
concert, Henry Field Seed company and friends.
KGO, Oakland, Calif. (Pacific, 312), 4-5:30 p. m., con-
cert orchestra of the Hotel St. Francis; 8, San Jose
Soloists' band; Mrs. George W. MacMillan, soprano;
saxophone quartet; G. Franklin Roberts, baritone; Ed.
Moore, cornetist; D. E. Neal, bass; Edna Kindall,
pianist; 10-1, Hotel St. Francis dance orchestra.
KGW, Portland, Ore. (Pacific, 492), 8 p. m., chil-
dren's musical program, pupils, Marie C. Dooley; 10,
dance music, George Olsen's Metropolitan orchestra.
KHI, Los Angeles, Calif. (Pacific, 395), 12:30-1:15

Waldorf-Astoria orchestra; 8:20-8:35, "The Sluins of
London," Geo. Laval Chesterton; 8:35-8:50, Frank
Anderson, baritone; 8:50-9:50, program, auspices of
N. Y. Times, Dunlap, Radio editor; 10:15-10:30,
"Exchange of Populations between Turkey and Greece,"
A. C. Jacquin of Near East Relief; 10:30-10:45,
Elsie Aherns, soprano; Marion B. Witcover, contralto;
11-11:30, Club Lido Venice orchestra presented by
Paul Specht.
WLAG, Minneapolis-St. Paul, Minn. (Central, 417),
11:35-12 m., postcard club; 7:30-8:15, business mes-
sages; 8:15-10 p. m., municipal band concert direct

Tompkins, D. D., rector.
WJZ, New York, N. Y. (Eastern, 455), 9-10 a. m.,
children's hour; 11-1 p. m., church services; 8:30-9:50,
Stadium concert New York Philharmonic orchestra.
WLAG, Minneapolis-St. Paul, Minn. (Central, 417),
10:20-12 m., service, Westminster Presbyterian church;
4:15-5:40 p. m., services, House of Hope Presbyterian
church; 7:45-9, service, Central Lutheran church.
WLS, Chicago, Ill. (Central, Daylight, 345), 6:30-8
p. m., Italian choir, Derrfuss Concert company, as-
sisted by Dorothy Derrfuss.
WLW, Cincinnati, Ohio (Central, Daylight, 423), 9:30

program; 4-4:30, magazine reading; 6-7 p. m., dinner
hour concert, Geo. Osborn's Nicolett Hotel orchestra;

WLW, Cincinnati, Ohio (Central, Daylight, 423), 4
p. m., opera talks; 8, grand opera, Cincinnati Summer
opera season, Ralph Lyford, director; Music Market.

WMAQ, Chicago, Ill. (Central, Daylight, 447.5), 6 p. m.,
Chicago Theater organ; 6:30, Hotel LaSalle orchestra.

WOAW, Omaha, Neb. (Central, 526), 6 p. m., special
half hour; 6:30-7:30, dinner program, Randall's Road
(Continued on page 12)

Monday, July 14

(Continued from page 11)

orchestra; 9-11, recital program, Vocal Class of Lee G. Krutz.
WDC, Javenport, Ia. (Central, 484), 12 m., chimes; 5-15 p. m., chimes; 6-30, sandman's visit; 8, Etta B. Stilles, reader; Maggie Marsh, violinist; Louis Crowder, pianist; 10, Pasadena orchestra.
WOO, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., Mary E. Vogt, organist; 12:02 p. m., Wana-maker crystal tea room orchestra; 4:30, Mary E. Vogt, organist; 7:30, Hotel Adelphia concert orchestra; 8, health talk, Pblia. Bureau of health; 9, R. O. T. C. band; 10, Hotel Adelphia dance orchestra, A. Candelori, director.
WDR, Newark, N. J. (Eastern, Daylight, 405), 2:30-2:45 p. m., talk, New York Y. M. C. A.; 2:45-3, Lena Klevsky, pianist; 3:30-3:45, talk, Charu magazine; 3:45-4, Lena Klevsky, pianist; 6:15-7, Elito orchestra, Dolph Robucci, leader; 8-8:15, Alva Polaska, soprano; 8:30-8:45, "I See by the Papers," says "Hollywood" McCosker; 8:55-9, Alva Polaska, soprano; 9:05-9:30, Common Sense of Music, Dr. Sigmund Spaeth; 9:30-10, Manhattan serenaders; 10:15-11, WOK Monday Nighters, classical program.
WDS, Jefferson City, Mo. (Central, 440.9), 8 p. m., "Crushing Cup with Lime," "Insurance for You, Next Clover Club," "The March Westward," Colonel Arthur T. Nelson; 8:20, varied musical program, Moberly talent.
WJ, Chicago, Ill. (Central, Daylight, 448), 3-4 p. m., "Pressure Cookers," H. F. West.
WTAM, Cleveland, Ohio (Eastern, 390), 8 p. m., Prof. Bernard Melzak, pianist; Lilyan Baron, violinist, Palmantolo Ruffo, tenor; Geraldina Watrus, soprano, fashion developments of the moment, Women's Wear; 3:10, songs; 3:25, current topics, Editor of the International Interpreter; 3:35, pianist; 3:50, "What Women are Doing Today," Mrs. William Alherton Du Puy; 4, songs; 4:10, book review, auspices of the League of American Penwomen; 6, stories for children, Peggy Albion; 6:20, talk on education, auspices, National Education association.
WVJ, Detroit, Mich. (Eastern, 517), 8 a. m., setting-up exercises, R. J. Horton; 12 m., Detroit News orchestra; 8:30 p. m., Schmemman's band; 9:30, Detroit News orchestra.

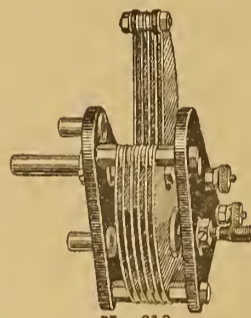
Tuesday, July 15

Silent night for: KFPA, KFSG, KQV, KYW, WAAW, WDAE, WEAD, WFI, WDC, WDD, WDR, WRC, WSAI.
CKAC, Montreal, Can. (Eastern, Daylight, 425), 7 p. m., kiddies' stories in French and English; 7:30, Mount Royal Hotel orchestra; 8:30, variety program; 10:30, Joseph C. Smith and his Mount Royal Hotel dance orchestra.
KFNH, Shenandoah, Ia. (Central, 266), 7:30 p. m., Elks band, Harry Day, director.
KGD, Oakland, Calif. (Pacific, 312), 8 p. m., Musaeus trio, Natalie Levin, violinist; Joziana Van der Ende, cellist; Wilhelmina Wolthus, pianist; Eva Gruninger Atkinson, contralto; Walter H. Bondy, baritone; Jack Sheen, tenor; court scene from "Merchant of Venice," Wilda Wilson Church, director; William Emery, tenor; address, "The Imprisoned Splendor of Service," Rev. Harvey V. Miller; duet for contralto and baritone, Corinne Keefe, Walter H. Bundy; 10-1, Hotel St. Francis dance orchestra.
KGW, Portland, Ore. (Pacific, 492), 3:30 p. m., talk, Jeanette P. Cramer; 10, dance music, George Olsen's Metropolitan orchestra; Leona Mourton, contralto.
KHJ, Los Angeles, Calif. (Pacific, 395), 12:30-1:15 p. m., concert; 2:30-3:30, matinee musical; 6-6:30, Art Hickman's concert orchestra; 6:45-7:30, children's hour, Prof. Walter Sylvester Hertzog; weekly visit of the Sandman and Queen Titania; bedtime story, "Uncle John"; 8-10, de luxe concert; 10-11, Art Hickman's dance orchestra.
WBAH, Minneapolis, Minn. (Central, 417), 12:30-1:30

p. m., Dick Long's trio and soloist; 7-7:30, musical, Minneapolis Boy Scouts.
WDAF, Kansas City, Mo. (Central, 411), 3:30-4:30 p. m., The Star's radio trio; 5-5:30, weekly child talent program, pupils of Concession School of music; 6-7, school of the air, piano tuning in number on the Duo-Art; third of a series of piano lessons, Maudellen Littlefield; address, Clarin, Zumwalt; the Toll-Me-a-Story Lady; music, Carl Norberg's Pianistun players.
WDAF, Philadelphia, Pa. (Eastern, Daylight, 395), 11:45 a. m., daily almanac; 12:02 p. m., organ recital, Stanley theater; 12:30, Arcadia cafe concert orchestra; 2, Arcadia cafe concert orchestra; 7:30, Dream Daddy's bedtime stories.
WFAA, Dallas, Tex. (Central, 476), 12:30-1 p. m., address, DeWitt McMurray; 8:30-9:30, vocal recital, B-Natural quartet; 11-12, Mrs. Margaret Fifer and her orchestra.
WGR, Buffalo, N. Y. (Eastern, Daylight, 319), 12:30-1 p. m., George Albert Bouchard, organist; 6:30-7:30, dinner music.
WGY, Schenectady, N. Y. (Eastern, 380), 6 p. m., dinner concert, Joseph A. Cluckene and his Clover club orchestra; 7:45, El-Kays Saxophone orchestra, Leo Kiliwan, conductor; Gora L. Whitmyre, contralto; Mrs. Stuart G. Knight, accompanist; "Services of an Architect," C. E. Schermerhorn; Charles Rowe, saxophonist; Mable Kihmer, soprano; 9:30, Emily C. Kullison, violinist; 10:15, Stephen E. Boisclair, organist.
WHAA, Iowa City, Ia. (Central, 484), 12:30-1 p. m., readings, music; 8, "Rules of the Air," Prof. Floyd A. Nagler.
WHAS, Louisville, Ky. (Central, 400), 4-5 p. m., Dick Quinlan's Golden Derby orchestra; Alamo Theater orchestra; 7:30-9, Zur Schmiede Harmony singers.
WIP, Philadelphia, Pa. (Eastern, Daylight, 509), 1:05 p. m., seashore gossip; 3, "What the wild waves are saying"; 3:30, Comfort's Philharmonic orchestra; 6:05, WIP little concert orchestra; 7, Uncle Wip's bedtime stories; 8, Comfort's Philharmonic orchestra; 8:45, "What the wild waves are saying"; 8:50, Vesallias concert band, Inga Wank, contralto; 10, Bob Lehman's dance orchestra; 11:05, Marburger's Reading Pennsylvania dance orchestra.
WJAX, Cleveland, Ohio (Eastern, 390), 7:30 p. m.,

program furnished by Cleveland News-Leader; E. G. Johnson, bedtime story; Don Palmer, radio talk cartoon; Joe Smith-Martha Lee Club orchestra; special features, favorite entertainers.
WLAG, Minneapolis-St. Paul, Minn. (Central, 417), 10:45-11:15 a. m., household hints; 11:35-12 m., surprise hour; 2:10-2:40, woman's club hour, talk arranged by League of Women Voters; 2:40-4, matinee magazine reading; 6-7, dinner hour concert, Geo. Osborn's Nicolet Hotel orchestra; 7:30-8:15, farm lectures.
WLW, Cincinnati, Ohio (Central, Daylight, 423), 10 p. m., Glee club, Littleford Collegiate school of business; Robert Schneider, violinist; Harriet Morris, pianist; Clara Bamberger, reader; Luella Foster, whistler; G. E. McClellan, baritone; 10:30, Foster's Southern Bellhops; 11:30, William C. Stress, violinist; 11:55, Chubb-Steinberg orchestra.
WMAQ, Chicago, Ill. (Central, Daylight, 447.5), 6 p. m., Chicago Theater organ; 6:30, Hotel LaSalle orchestra; 8, talk, Harry Hansen; 8:20, John Clark, baritone; 8:40, French lessons; 9, Civil Service commission; 9:15, Maumaloa Hawaiian trio; Harry Geske, pianist.
WDD, Philadelphia, Pa. (Eastern, Daylight, 509), 11 a. m., Mary E. Vogt, organist; 12:02 p. m., Wana-maker crystal tea room orchestra; 4:30, Mary E. Vogt, organist.
WDR, Newark, N. J. (Eastern, Daylight, 405), 2:30-2:45 p. m., "Suburban Bee-keeping," Walter C. Morris; 2:45-3, Harry Jentes, pianist; 3:30-3:45, Harry Jentes; 3:45-4, "Indian Legends of Old New Jersey," Ernest A. Reed; 6:15-6:30, Halsey Miller and his orchestra; 6:30-7, "Man in the Moon Stories," for children; 7-7:20, Eaisay Miller and his orchestra; 7:20-7:30, Resume of the day's sports.
WQJ, Chicago, Ill. (Central, Daylight, 448), 3-4 p. m., "From Immigrant to Inventor," Rev. Fred Harrison; "The Frame for Your Face," Anne Prang Knechans; "Various Classes of Lighting," Curtis Lighting; 7-8, Laneater Smith, bass; "Real Estate Mortgages a Safe Investment," Cook County Real Estate board; Mrs. Lancaster Smith, pianist; 10-2, Ralph Williams and his Rainbo Garden orchestra; Phil Fleming and Vernon Rick, "The How Do You Do Boys"; "How to Get Better Radio Reception," Harry J. Marx.

The Kellogg New Eleven Plate Condenser



The Kellogg Switchboard & Supply Company in keeping abreast of radio developments has found that the amateur and radio experimenter are interested in a condenser with vernier capable of being tuned from one to ten micro-microfarads.
The Kellogg No. 610 condenser is designed to provide a vernier of minute capacity and that can be used as a bias. It also provides the greatest degree of efficiency in circuits requiring grid, micrometer or biasing condenser. Unnecessary wiring is eliminated when using this condenser. The number of pieces of apparatus to build a set is reduced.

If your dealer does not carry Kellogg, write us giving his name.

USE—IS THE TEST

KELLOGG SWITCHBOARD & SUPPLY COMPANY

1066 W. Adams St. CHICAGO, ILL.

Save at Modell's Some of Our Many Bargains

LOOP AERIAL
D76. Can be assembled by anyone in five minutes; all wood parts, wire and binding posts included, complete, 69c



RADIO SOLDERING IRON
Indispensable for the man who builds his own sets
D109\$1.95
D133—Soldering Paste, tube......25

PLATE CIRCUIT "B" BATTERIES
D80—22 1/2 Volt Small.....\$1.15
D81—22 1/2 Volt Medium.....1.45
D82—22 1/2 Volt Large.....1.95
The highest grade of battery made a price lower than they ever were sold before.

WOOD CABINETS
Highest grade Mahogany finish Cabinets. Hinged top. These cabinets are being sold at less than one-half regular value.
D57—Wood Cabinet; panel size 7"x10", each.....\$2.50
D58—Wood Cabinet; panel size 7"x12".....2.75
D59—Wood Cabinet; panel size 7"x14".....3.00
D60—Wood Cabinet; panel size 7"x18".....3.50
D61—Wood Cabinet; panel size 7"x21".....3.75
D62—Wood Cabinet; panel size 7"x24".....4.00
Baseboards (Mahogany Stained) for use with above cabinets
7x10.....25c 7x14.....35c 7x21.....45c
7x12.....30c 7x18.....40c 7x24.....50c

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America's Greatest Radio Retailers
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MAIL ORDER DEPT.
58 Church St. NEW YORK CITY



12 Cells 24 Volts
\$4.00 COD SPECIAL
INTRODUCTORY PRICE

For a limited time only, and to introduce this new and superior Storage "B" Radio Battery to the Public, we are selling it for \$4.00. Regular Retail Price is \$6.00. You save \$2.00 by ordering NOW. A finer battery cannot be built than the

World Storage "B" Battery (12 Cells - 24 Volts)

To ten million homes with Radio Sets—and to countless millions of prospective buyers—a this WORLD Storage "B" Battery brings a new conception of battery economy and performance. Here is a battery that pays for itself in a few weeks—will last for years and can be recharged at a negligible cost. And you save \$2.00 by sending the coupon now.

A SUPERIOR BATTERY Equipped With Solid Rubber Case
The Solid Rubber One-Piece Container is an Exclusive Feature with the WORLD Storage "B" Battery. An insurance against breakage, acid and leakage. Has heavy duty 2 1/8 in. x 1 in. x 1-4 in. plates and plenty of acid circulation. Extra heavy glass jars allow ready observation of charge and prevent leakage and seepage of current. It holds its charge, while idle, at constant voltage.
You will find this battery a boon to long distance reception. It does away with a great many noises as often blamed on "static." Clip and mail the coupon today.

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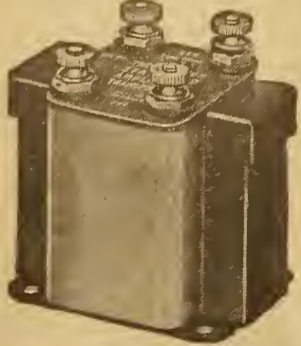
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Chapter XVII—Reproducers; the Finishing Touch of Radio

By P. E. Edelman

IN THIS series of articles the story of Radio is told in so simple a manner that the uninitiated can follow theory and practice whether or not he knows anything about electricity or its application to broadcasting and reception. The series consists of twenty-five chapters, of which the five next will be:

Chapter XVIII—The Hero Circuits of Radio.
 Chapter XIX—What is Doing in Complicated Circuits.
 Chapter XX—How Far Can I Hear?
 Chapter XXI—Choosing a Radio outfit.
 Chapter XXII—Making Your Own Radio.

EVERYTHING that has gone before, from the time that the original sound is broadcast until it passes through various carrying and amplifying

means to move it. The diaphragm communicates this motion via the air to the ears of the listener. A simple arrangement is indicated in Figure 157. A large number of turns of fine wire are wound

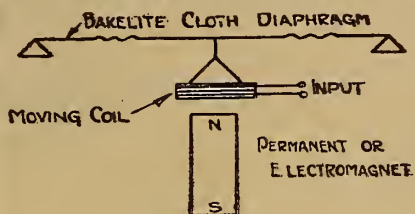


Figure 160

around a permanent magnet carried in a casing. A thin iron diaphragm is clamped against the casing so that the magnet and the winding can pull on it via magnetic lines of force. The diaphragm can thus be flexed each time a little changing pulse of current is sent through the winding.

That is why you sometimes can hear the carrier of a distant station without getting the voice clear, if at all. In such case your local receiver heterodynes its oscillations with the incoming feeble frequency received, but the incoming frequency is not carrying enough energy to properly actuate your detector or rectifier.

Headsets should be connected so that the battery or plate current aids the magnetic field of the permanent magnets and such makers label the terminals for this purpose. By trial, you can determine which connection gives best results. Some earphones and many types of loud speakers use a mica or other diaphragm connected by a mechanical linkage or lever to the actuating magnetic pulling means, as indicated by Figure 159.

Loud Speaker Unit

One form of loud speaker unit employs a moving coil and this coil is connected to move the diaphragm. The input current is sent through this coil under the influence of a permanent or electromag-

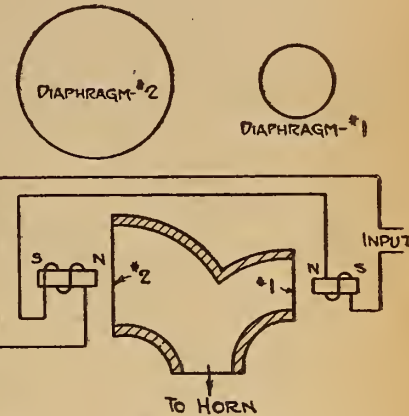


Figure 164

net and operates the diaphragm as usual. Other kinds of speakers are built up by using

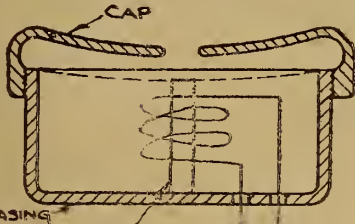


Figure 157

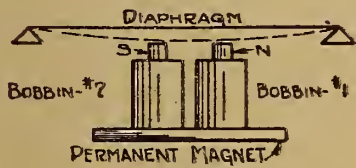


Figure 158

mediums, aims to actuate a reproducer. Common reproducers are known as headsets or earphones, and loud speakers. The finishing touch of Radio comes at the reproducer where electrical currents are converted back into the form of sound.

Broadcast listeners include some people who are satisfied with getting some distant station, even if not clearly, just to hear that a program is going on. Others are more interested in getting clear reproduction, if only from a much nearer station from which an entire program can be understood without interruption. Principle of Telephone Receiver

An earphone or telephone receiver comprises a diaphragm with electromagnetic



Figure 161

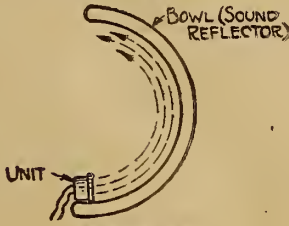


Figure 162

Most earphones are built with double magnet windings as diagrammed in Figure 158. A ring-shaped permanent magnet has poles N and S each carrying a bobbin winding. Two units are connected in series, one complete unit for each ear. In connecting-in additional sets of ear-

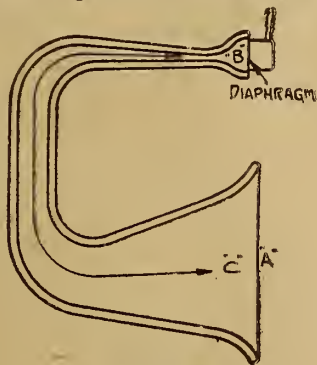


Figure 163

phones, the series connection is preferably used. Telephone receivers are very sensi-

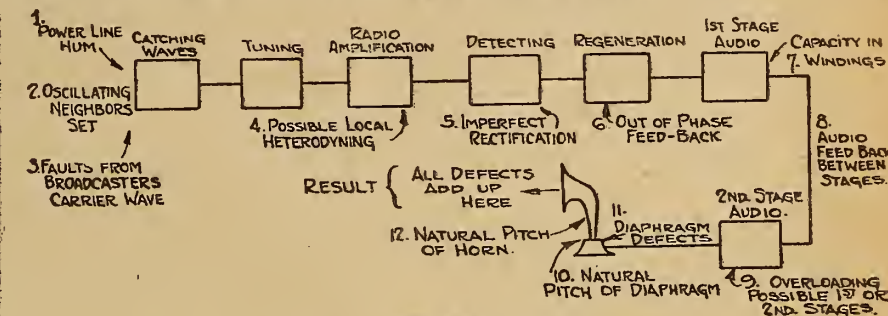


Figure 165

net and operates the diaphragm as usual. Loud Speakers Without Diaphragm There are some types of loud speakers using cones or other sound surfaces besides the well known diaphragm. Sometimes a parchment cone is used as in Figure 161. Receiving reproducers of this

reflecting surfaces. A simple form comprises a unit facing a bowl or sound reflecting surface, per Figure 162.

Purpose of Horn

Most loud speakers employ a horn. A horn has the effect of concentrating and (Continued on page 16)

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Household Helps

Aid in Keeping Abreast of the Times

RED plush photograph albums, parlor whatnots and horse-hair furniture have largely vanished from the homes of the land along with the other decorative doodads of a few generations ago, but there are still many American homes where artistic interior decoration has continued to be conspicuous by its absence.

Toward correcting this situation, Radio is undoubtedly contributing more today than any other single factor. Not only has the new art brought thousands of homes into daily and intimate contact with the great outside world and its large and varied interests, but it has brought into homes new ideas and additional knowledge of everyday household problems and interests which are helping to make the average home a much happier and more attractive place in which to live.

Housewives all over the land not only have an opportunity to hear the best of music but they can keep in touch with the best menus for family meals, dressmaking and millinery hints. Through talks on home decorations and furnishings the housewife in the smallest village or on the remotest farm comes in touch with current ideas in the metropolitan centers. Not only does she learn that fringed tidies, seashells with ribbons tied around them, and dried ferns under glass have passed out but she is also informed what has come into take their place.

The Radio brings her up to date and reliable information on color schemes, curtains, draperies, wallpaper, hangings, pictures and types of furniture.

Those Big Spark Transgressors

Spoiling an Evening's Entertainment with Dashes

THERE is never anything so satisfying to some individuals as to be constantly annoying other folks even though the thing done has no personal gain. The great Radio crowd has enough annoyances and difficulties to overcome without some egotistical person that wants his presence known. You can find those fellows everywhere, they are always with us, throwing monkey wrenches into the machinery or casting a chunk under the wheels of progress. The air hound is one in this class. Why such a person must come in on the air when Radiophans are enjoying the time when they have the leisure, the fore part of the night, is more than a person of rational mind can comprehend.

You will say its thoughtlessness of the party doing the act. No! its not thoughtlessness at all, its pure meanness and a desire to be heard. We have those little fellows in every locality who persist in clogging up the air just at a time when thousands are wanting to hear something particular of interest to them.

Then, too, we have the big fellow who goes under the name of high officials and makes tests for the government. The eastern section has this difficulty. A powerful spark is sent out during the first part of the night or at a time when the best Radiocasts are on and it destroys all the signals. Why this test should be made at nine o'clock and on until midnight is quite beyond the average person's ability to answer. It is nothing more than downright meanness, for this test could be made at midnight and thereafter just as well.

Rural Popularity of Radio

Has Greater Influence Than the Telephone

RADIO, while generally regarded as belonging more to urban than to rural life, has become popular in the country. The department of agriculture recently completed a survey showing that 145,000 farm families are now equipped with receiving sets.

Based upon an estimate of five persons to a family, this would mean that there are now 750,000 rural Radiophans capable of tuning in and hearing the various programs put on at broadcast stations.

Radio may work as a greater influence than the telephone, good roads, electricity or the motor car in keeping the people on the farm, for these conveniences, in many cases, only increased the hunger for urban things.

RADIO INDI-GEST

You Owe Us Four Dollars, Ambrose

Dear Indi: Enclosed you will find a Masterpiece (?) written in song that seems to size up the present Radio situation pretty well, especially the patent situation. If you can use it in your publishing machine you have my wholehearted consent to do so. If it is good please send me a super-heterodyne for it; if it is not so good send me a crystal set. If it is not worth publishing will you please loan me two bits on it.

Here goes: (To be sung by members of the asylum to the tune of Casey Jones, accompanied by the Choo-Choo whistle of WLS in Memory of the brave martyr in whose honor this song was written.)

Come all you Hams if you want to hear
The story of a Radio Engineer.
Casey was an amateur of worldwide fame,
Ho invented a circuit that bears his name.

CHORUS
Casey Jones, for hours he did toil,
Casey Jones, never would he shirk,
Casey Jones, he burned the midnight oil,
He never slept a wink till the circuit worked.

Now Casey got a patent on this circuit fine,
He called it the Hokuspokussuperiodyne.
It would bring in China and WNT,
So he sold it to the company of A. T. & T.

CHORUS
Casey Jones, he sold his little patent.
Casey Jones, to a powerful company.
Casey Jones, he sold his little patent.
He sold his little patent to the A. T. & T.

Now Casey was sued in the Court Supreme
For infringing on the patent of a highfalutin "Bean."
They put him through the mill and he came out cleaned,
Now he rides no more in his limousine.

CHORUS
Casey Jones, has started back to workin'
Casey Jones, he loafs never more.
Casey Jones, has started back to workin'.
Now he fools no longer with his Radio.

If this don't get 'em carbohic acid will. Yours very truly,
5AKB.

A Radio-phanette who is reducing has to do her dozen stations daily.
W. B. P.

J. M. Witten, genial WOS, Jefferson City, announcer, dropped in the other day. And here we were, thinking he was a convict! "Do you lock up the Prison Band when they're in the studio?" we asked. "No," J. M. replied, "but I carry my Army 45 for luck."

Thought for the Day

Oft in the stilly night, ere slumber's chains have bound me,
I listen to the jazz, and other things around me.
And sighs and tears and childish fears again and yet assail me,
And I weep in vain for a classic strain—but what do my weeps avail me?
PAPRIKA.

There's just two classes of Radiophans; those that listened in on the Republican convention, and those that listened in on the Democratic.

Mrs. Partington Speaks Out

Dear Indi: Mizz Partington says her friends Roxie and his gang at WEAF went out and raised a lot of money and bought Radios for all the "shut in" fellers at the service hospitals so they can listen in and enjoy being sick.

She says Roxie should "ort" to hurry up and buy good sets for two more "shut ins" so they can trade off their crystal sets they must of had, then they can listen better to the convention, next time, and they won't be the only two people that won't know what the convention done until a month after they concluded their final number and signed off. The campaign committee could afford a contribution big enough to help Roxie buy two Super-Hets in place of buying railroad and parlor car tickets for one feller from every State but Wisconsin, besides a chairman, to make a trip to the White House, so they can holler for Cal. to come to the front porch a minute, while they let him know for sure he's the one they voted into getting onto the ticket next fall; and more tickets to buy on the railroad, for another crowd like that, which has to go to Chicago and wait for the bank to open up, for them to git in and break the bad news to Charlie Dawes what the convention done to him; and when he finds out its him that can't tune in on nothing but the Senates' programs for four whole years, why, if he don't say "Hell Mariar!" or worse than that, even, he is not a going to git her vote next fall, whether he gits the Senate Committee to O. K. his expenses account or not.

SIGNING OFF.

Oh where, oh where have my Indi scribes gone?
Oh where, oh where can they be?
They think that because it is summer time,
My mail box should be empty!
INDI.

Next Song Will Be a Dance

Dear Indi: "You are listening to Station K-W-I-T, Podunk! Our next number will be 'The Waters of My-new-skonker,' an effusion of that greatest of American songwriters, Drillen Wholes.
"Madame Luce—Howle, lyric soprano, will splash—
"Mr. Pennyworth A. Nichol, pianist, will paddle.
"One moment, please!"
JACK-POI.

Premeditated Murders



Condensed

By DIELECTRIC

Probably no definite plan to support Radiocasting has yet taken final form, though the question of who is to pay keeps bobbing up in the minds of both those who now operate studios and the Radiophan. It is believed in some quarters that the civic Radiocasting plan is the most likely one to meet the situation. The city of Milwaukee has taken over Station WCAY which receives its support now from ten firms, each contributing \$2,500 annually. Again we wonder if business houses will take care of civic stations, or popular subscriptions be raised for the purpose.

Usually some species of bird life is to be seen and heard in the cities, if only the chirping of a sparrow, and yet song birds are seldom found in densely populated areas. So many thousands of Radio listeners never leave the cities for country attractions that what is brought to them via Radiophony of rural nature is greatly appreciated. Not long ago the song of the nightingale was sent through the ether to English listeners in, a treat which is rare indeed to Londoners. One of our own song birds, the robin, volunteered his services at a Radiocasting from the University of Iowa, WHAA, of the baccalaureate sermon delivered on the campus and was heard distinctly throughout much of the service. Occasionally we have to entertain us men who know the wild life of the jungles and their talks help to visualize these unusual beasts and birds, yet, with the aid of their calls or song we could feel better acquainted.

In no sense of the word is amateur aid to commercial interests a gain-seeking endeavor; the Radio amateur is glad to use his knowledge whenever needed. However, it is only natural for a beneficiary to wish to reward his amateur benefactor as instanced in the case of two boys, operators of Station 9DOE in Duluth, who had maintained constant communication with a ship tied up in an ice blockade at the entrance of Duluth harbor. The president of the company owning the ship gave to the boys passage to Detroit, entertainment while there and stops at the important islands in the Great Lakes. If the zeal for amateur Radio work is not increased thereby, nothing will do it. Yet reward was not their objective.

When the Los Angeles Times conceived the idea of awarding a substantial prize to the best orator among California school pupils, there began a movement which culminated in the Radiocasting of orations by the seven winners in as many zones throughout the United States, comprising one million scholars in all. These seven boys and girls had the distinction of being preceded by President Coolidge in a speech which, together with theirs, carried to a vast unseen audience tuned to one of the three stations Radiocasting the proceedings from Washington. Other scholars listening in will be spurred to greater efforts when the contest is renewed next year, as it certainly should be.

Why the move to enlist public interest in securing receiving sets for the disabled veterans of the World War should have come so late is more than I can explain. But, thank heaven, it's here now! A thrilling experience was that of listening to the program put out from the Shubert-Boston opera house by Station WNAC, WTAT, WGI and WBZ last month as a benefit performance to purchase Radio equipment for wounded veterans. Orchestra music, glee club and quartet singing, instrumental trios and sketches comprised the amusing features, while Major General Edwards gave an inspiring address. Let's hope the good work has only begun.

Underground Antennas for Summer Receiving

Part III—Installation for Limited Space

By Edward Thomas Jones, A.I.R.E.

IT MAY not be possible for a great number of listeners to install either of the systems already discussed in the first two articles of this series. That is why we are going to take up the authors work on underground antennas as it was he who made considerable im-

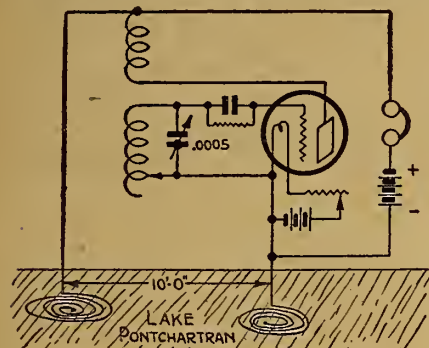


Figure 9

provements over the Rogers system during the war—which work was protected by patents number 1,372,658 and number 1,429,240. While working on the Rogers system, the length of the wires required for good reception always bothered me. I was determined to reduce the overall dimensions of the antenna installation. In fact, that was very necessary, as the department was having considerable trouble in purchasing adjoining property on which to run the Rogers long wave wires.

Details of First Experiment

My very first experiments were conducted in Lake Pontchartrain, La. In most of these experiments, two coils were employed—without direct ground connection. Two coils each 24 inches in diameter and composed of 200 feet of high tension cable were lowered into the lake and rested on the mud bottom approximately four feet below the surface of the

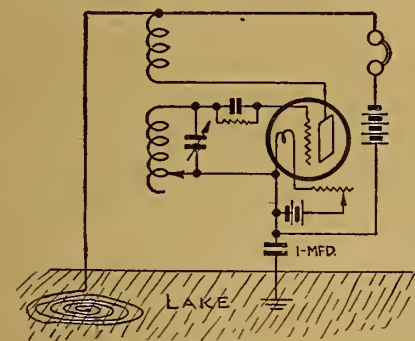


Figure 10

water. The water was slightly brackish but not salty enough to cause the system to work in any way different than when the coils were submerged in fresh river water. The coils were spaced 10 feet apart as shown in Figure 9. No audio amplification is shown in this drawing for the sake of simplicity—however, the usual two-stage amplifier was employed during the experiments.

An ordinary variocoupler serves as the tuner. To the outside—longer winding of the variocoupler—a 23-plate, .0005 variable condenser is shunted. The rotor of the variocoupler is connected in the plate circuit in the usual way.

Second Experiment

My next experiment consisted of the same coils submerged to a depth of 12 feet in the Mississippi river. The coils were spaced 50 feet apart, that being the best distance of separation found by exhaustive experiments. With these coils buried in the river—and connected to the standard navy type receiver, it was possible to pick up numerous distant stations with exceptionally good volume accompanied by very little static. The following stations were picked up: Swan Island (900 miles); NAX, Colon, Panama (1,300 miles); NAR, Key West (650 miles); NAA, Arlington, Va. (750 miles); time signals, NAJ, Great Lakes (1,050 miles); working on small 2 kw set, XAB, Mexican station (750 miles) and many others.

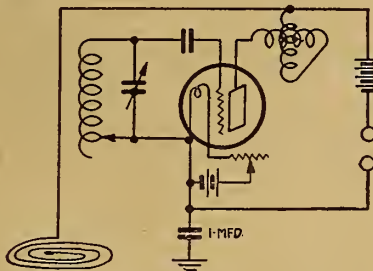
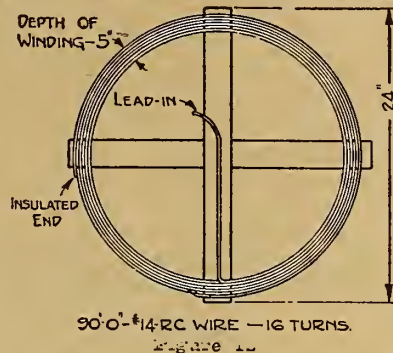


Figure 11

These stations' wave lengths ranged from 600 to 4800 meters. No directional effects were noticeable. Signals from all directions came in with what was considered equal intensity. It was ascertained from these experiments that; due to the concentration of the inductance, it not being distributed at considerable lengths as in the Rogers system, the signal-static ratio of the authors system greatly exceeded that possible with the Rogers system.

Increasing Size of Coils

Next we tried increasing the size of the coils. Coils 4 feet in diameter were built, lowered into the river and tested under the same conditions that the smaller 2 foot coils were. A marked increase in signal strength was noted. The signal



static ratio was very nearly the same. Of course, the larger the coil, everything else being the same, the poorer the signal-static ratio—because of the increased pick-up area of the coils. At no time, however, will the ratio be less than that possible with the Rogers system.

It was later determined that one of the coils could be eliminated from the circuit and even under those conditions the signal-static ratio held up very well (Figure 10). Here, a one micro-farad condenser is connected between the filament and the ground in place of the insulated coil. This increases the volume,

but does not permit the same signal-static ratio.

In fact, it was determined very early that the very best results were only obtained when the system employed buried-insulated wires for both the usual antenna and ground connections. It is absolutely necessary that the coils be built with free-open ends. This is clearly shown in all the drawings. The open end is insulated by placing it in an ordinary clay tube and filling the same with molten wax or rosin, as pointed out earlier in the series.

A modification of Figure 10 is shown in Figure 11 where a variometer is shown

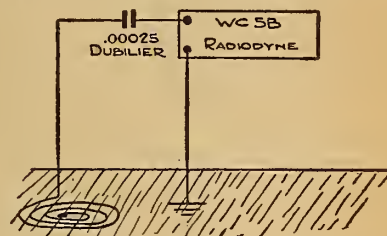


Figure 13

connected in the plate circuit of the detector to provide regeneration. This (Continued on page 16)

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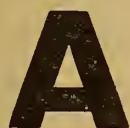
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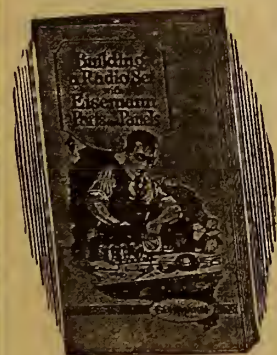
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with the first really portable, long distance receiver—fitted in a camera case with standard batteries, tube and head phones self-contained—weighs only 4 1/2 lbs.

KODEL

The Camera of Radio

gets all local and many distant stations without aerial—the ideal receiver for home, camping or traveling.

Popularly Priced at

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Without Accessories

See KODEL at your dealer's or write direct for literature.

Front View—Showing phones, antenna and ground wires fitted in ready to close.

THE KODEL MFG. CO.
Clarence E. Ogden, Pres.
279 W. THIRD ST. CINCINNATI, O.

THIRTY-MINUTE A-B-C

(Continued from page 13)

focusing the sound waves so that an apparent amplification results. A horn is indicated in Figure 163. The mouth A is sometimes called a bell and the length B should be carefully curved and tapered to get good accoustical results.

It is possible to use two diaphragm inputs for a horn as indicated in Figure 164 and this might be an advantage if one diaphragm is large and the other small, so as to get more uniform frequency reproduction. Any diaphragm tends to respond to certain frequencies much better than to others, so that the best reproducer is one which minimizes this effect. The natural vibration of a diaphragm can be enhanced to the detriment of reception if a tiny horn with its own natural vibration period is used.

In Figure 165 there is a diagram of the sources of distortion and noise in a typical receiving outfit. One or more or all of these can partially affect or spoil clear reception.

Though your own outfit differs from the example indicated, one or more of the causes may possibly be recognized in any type of receiver.

Transformation of Energy Means Loss

It should be clear that the various transformations of form of energy employed in Radio, starting from the broadcaster, and extending to the reproducer, mean loss in form and value. The value is easily made up by supplying local energy via amplifiers but the form loss repeats.

Hearing depends on the individual. Some persons have a range of frequencies within audibility which others are deaf to. Many people hear better with one ear than with the other and certain frequencies better with one ear than the other. The pair of ears was intended for the so called binaural or directional effect. A sound coming from your right reaches your right ear before it comes to the left ear and you recognize this difference in time value or phase and can thus judge direction.

Caution in Using Earphones

Constant prolonged use of earphones is tiring. Do not wear a tight headband nor keep the earphone tightly pressed against your head for long periods.

(How so many circuits have made the name of their inventors well known will be the inspiring topic of the next article by Mr. Edelman.—Editor's Note.)

UNDERGROUND AERIAL

(Continued from page 15)

entirely eliminates the tickler coil. It was found, however, that the tickler was the best arrangement because the tuned-plate variometer circuit was too critical—especially so with the underground antenna system.

Present Installation

The installation used by the author at the present time is one which anyone can make use of. Down here in New Orleans where it is practically impossible in the summer months, such as June and July, to guarantee any reception from distant stations, the author accomplished exceptionally good results. This year, even better results will be obtained because the transmitters have increased their power and I have increased the sensitivity of my receivers, and have improved on the antenna installation. Of course, we are from 550 to 600 miles away from any powerful broadcast station, and

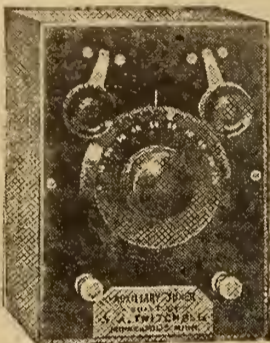
AUXILIARY TUNER

Patents Pending

Better Than a Wave Trap

Improved Model

A TWITCHELL AUXILIARY TUNER



connected to your instrument will positively eliminate all local interference and enable you to bring in distant stations at any time. They are in successful use within 400 feet of large broadcasting stations. They also enable you to receive on longer wave length than you can get without it.

Copyrighted diagram \$ 5.00
All parts including cabinet..... 9.00
Complete Tuner, Walnut cabinet..... 15.00

All Goods Prepaid

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Worksman Radio Service

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\$3.50 Workrite 180° Silk Wound.....\$2.95
3.50 Fisher, Large, 90°..... 2.75
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4.25 Special Bank Wound Coupler for Haynes Circuit (with diagram)..... 3.25
7.00 Ambassador Coil (with diagram)..... 5.50

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\$2.00 R. C. 11 plate.....\$1.05
2.25 R. C. 23 plate..... 1.35
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\$4.00 R. C. 23 plate.....\$2.25
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\$18.00 DR. SEIBT IMPORTRD "SUPER HEADSET".....\$6.90
\$12.00 N. & K., Imported.....\$6.90

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Mention second choice to be shipped if article ordered is out of stock.

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6 Volt 100 Amp.....\$12.60
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Size 7x18 inches.....\$ 2.00
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Radlola Type 1 Tube.....\$ 7.48
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VALLEY RADIO SUPPLY CO.
2206a Locust St. ST. LOUIS, MO.

Write for Agent's Confidential Price List.
Always include Parcel Post and Insurance.

during this time of the year it is not very often that we can pick up distant stations—even on the best overhead installation.

However, those broadcast listeners who live but from 200 to 300 miles from a powerful station will find this system of great help throughout the year. It not only reduces the static considerably during the summer months, but improves the quality of reproduction, due to the lack of much of the parasitic noises picked up by the overhead antenna installation.

Coil Used

The coil buried by the author is clearly described in Figure 12. Two pieces of wood, each 24 inches in length, were fastened together to form a cross. The number 14 rubber covered wire was fastened to the cross arms by insulated staples. The wires were run as close

Guaranteed Head-Sets

RED-HEADS" are guaranteed radio phones. You run no risk when you buy them. Money back if, after 7 days' trial, you're not satisfied that they're the best receivers on the market at the price. Why not act right now and get a pair? It'll mean getting the maximum from broadcasting from the day you put them into use.



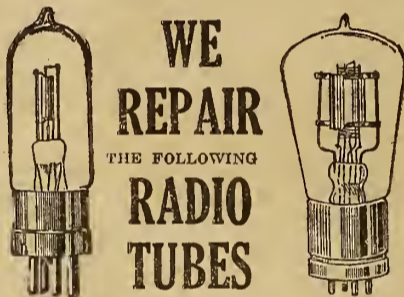
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NOW READY

The new 1924 Model F | The new "Red-Head" Jr.
\$6.50 Per Pair | \$5.00 Per Pair
Complete | Complete

"Red-Heads" sent prepaid on receipt of price if you are unable to get them at your dealers.

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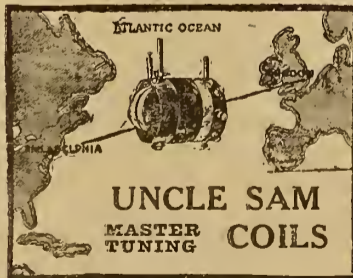
WD-11, WD-12, Our Specialties

WD-11.....\$2.50 DV-6A.....\$2.50
WD-12..... 2.50 UV-199..... 2.50
UV-200..... 2.50 C-299..... 2.50
UV-201..... 2.50 UV-201A..... 2.50
C-300..... 2.50 C-301A..... 2.50
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Quoting from front page of Philadelphia Inquirer, December 26th, 1923: "At about 10:57 o'clock Mr. _____ tuned in 2LO (London)."



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Brings in Stations You Never Heard Before

Ask your dealer or send self-addressed stamped envelope for wiring diagrams and panel layouts of circuits in which the wonderful Uncle Sam Coil can be used.

Price \$5.50

UNCLE SAM ELECTRIC CO.
217 E. 6th St. PLAINFIELD, N. J.

together as possible, the ninety feet of wire making a coil with a five inch depth of winding as shown. There are sixteen complete turns.

The coil was buried under the house—two feet deep. It was placed directly under the refrigerator so that the water dripping through the floor would keep the soil surrounding the coil moist at all times.

The receiver used is connected to the coil through a .00025 condenser. The ground connection going directly to the water works.

(THE END)

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53 W. Jackson Blvd., Chicago
50 Church St., New York



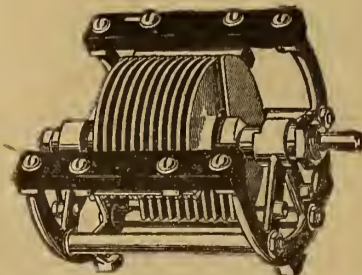
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It will pay you to keep your eye on PREMIER this season. There will be some new surprises that will make you "Sit up and take notice." PREMIER PARTS will be very much heard from and talked about so keep "tuned in." Send for latest Bulletin No. 92!

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THE MOST STURDY of the New Type

LOW LOSS CONDENSERS

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Sells only Guaranteed Radio Apparatus. Send for discounts.
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The Dubilier Dura-tran

The radio-frequency transformer that amplifies uniformly over all broadcasting wave lengths. Made to satisfy the man who knows radio.

DUBILIER CONDENSER AND RADIO CORP.
43 West Fourth Street, New York

Neutralized Radio Frequency Circuit

Eliminating Capacity Coupling Effect in Set

Radio frequency amplification with regeneration is usually difficult to attain, but this combination is one of the best known methods of eliminating interference from re-radiation.

WORKSHOP KINKS EARN A DOLLAR—

THERE are many little kinks worked out at home that would aid your fellow Radio worker if only he knew about them. There are new hook-ups, new ways of making parts and various unique ways of operating sets that are discovered every day. Radio Digest is very much interested in obtaining such material. Send them in with full details, including stamped envelope, so rejected copy may be returned. The work must be entirely original, not copied.

RADIO KINKS DEPARTMENT,
Radio Digest,
510 North Dearborn St., Chicago

Such a circuit, that is easily constructed and operated, is described herewith.

The tuning coil used in the circuit has an untuned primary, and in using a coil of this type in my experiments it was exceedingly difficult to find the proper type that would give an even control of regeneration.

I tried different types of coils, using the untuned primary principle, and finally devised a coil using a primary of Litz wire and a secondary of number 24 dsc. magnet wire, while the rotor was made in spider-web fashion and wound with the same size wire as the secondary.

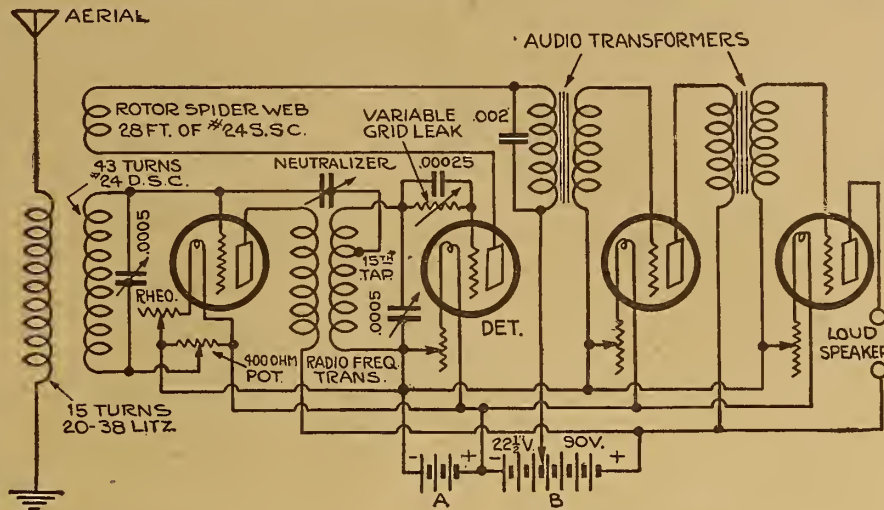
Using this new coil with the spider-web rotor mounted to give a 180 degree turn, I found that the regeneration was very easy to control and the circuit easy to handle. Any one so desiring can easily make this coil.

Material Necessary

- 2 Variable condensers, .0005 mfd. capacity, good grade.
 - 1 Neutralizing condenser.
 - 1 400-ohm potentiometer.
 - 1 Variable grid leak.
 - 1 Mica condenser, .002 mfd.
 - 1 Mica grid condenser, .00025 mfd.
 - 2 Audio transformers, ratio about 5 to 1.
 - 1 Panel 7x24 inches.
 - 2 Double-circuit jacks and 1 single-circuit jack.
 - 3 Rheostats, 20 ohms.
 - 1 Rheostat, 6 ohms.
 - 4 Tube sockets, standard base.
 - 2 45-volt B batteries.
 - 1 UV-200 tube.
 - 1 UV-201A tubes.
 - 1 6-volt storage battery.
 - 1 Piece bakelite or formica tubing 2 3/8 inches in diameter by 3 inches long.
 - 1 Piece bakelite or formica tubing 3 1/4 inches in diameter, 3 inches long.
 - 1 Piece bakelite or formica tubing 3 3/8 inches in diameter, 2 3/4 inches long.
 - 1 Hardwood disc 1 3/4 inches in diameter, 3/8-inch thick.
- Hardware for 180-degree rotor, degree angle, as shown in the illustration.

The neutralizing condenser must be adjusted for the particular type amplifying tubes used, and then remains constant. The method employed is the "balancing-

SPECIAL COIL USED IN HOOK-UP



out" principle. Tune in a strong signal, turn the filament off without removing the tube from the socket, and then adjust the neutralizing condenser until the signal entirely disappears.

This proves conclusively that this method eliminates regeneration instead of counteracting it, as it would be impossible to have regeneration with a cold filament. This circuit prevents the receiver acting as a miniature transmitter, and does not cause interference with nearby receiving sets.

The variable condenser shunted across the secondary of the Radio frequency transformer should be .0005 mfd. capacity, and be of very good quality, with low losses.

The specifications of the Radio frequency transformer are as follows: The primary consists of fourteen turns of number 24 dsc. magnet wire wound on a

piece of 2 3/8-inch tubing 3 inches long. The secondary has 58 turns of the same wire wound on a 3 1/4-inch tube, 3 inches long, and a tap is taken off at the fifteenth turn.

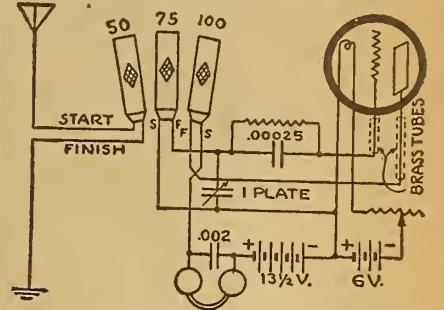
The primary is then placed inside the secondary so that both windings are parallel and in the same direction. This coupling is fixed.

The transformer should then be placed on the rear of the .0005 mfd. variable condenser at a 45-degree angle to eliminate any inductive effects.

The potentiometer used on the Radio

Stable Circuit Having Flewelling Qualities

This is not a freak circuit and it has the qualities of the Flewelling set. I have been using this set for some time and after tearing it down and rebuilding it I find that none of the receiving qualities



are lost. I have used a UV-200 tube but a 201 with 34 volts on the plate is much easier handled.—J. D. Carruthers, Gainsborough, Sask.

frequency tube should be of the non-inductive type.

—William H. Kleinberger, Philadelphia, Pa.

RADIO BY MAIL

- TELEDYNE KIT**
1-Special tuning coil and 1-Special R. E. coupler (Wound with green silk wire on BAKELITE tubing; complete with brackets, etc.)... \$6.39
- COCKADAY PARTS**
COILS—Green silk wire on BAKELITE..... \$ 3.19
LAVITE resistances, 4800-ohms..... .96
AMPLEX "Grid-densers"..... .39
AMSCO 26-Plate vernier cond..... 3.59
Bradley-Ohm (No. 10, No. 25 or No. 50)..... 2.00
COMO duplex audio transformers (per pair)..... 9.29
- ULTRA DYNE KIT**
Consists of 1-type "A" Ultraformer, 3-type "B" Ultraformers, 1 tuning coil, and 1 oscillator coil (coils silk on BAKELITE)..... 20.58
Set of 4-Ultraformers separate..... \$16.76
- ERLA REFLEX PARTS**
ERLA reflex or audio transformer..... \$ 3.99
ERLA "SELECTOFORMER"..... 3.89
ERLA Crystal Detector..... .79
RATHBUN condensers, 11-Pit..... 2.39
23-Pit..... 2.79
- "KNOCK-OUT" KIT**
Consists of 1-T1 and 1-T2 special wound transformers mounted on condensers (coils green silk on BAKELITE Tubing)..... \$6.79
Transformer coils separate, each..... \$2.94
BURGESS large 22 1/2-V "B" Batteries..... \$ 1.89
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Electrical Research Laboratories
CHICAGO. ERLA

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You can assemble one in a few hours. For distance, selectivity and loud speaker volume there's nothing better. The FADA 5-tube Neutrodyne outfit No. 167-A contains everything needed—the finest Neutrodyne parts that can be purchased. The FADA "How to Build It" book makes everything as simple as A, B, C. Buy the original FADA No. 167-A in the sealed package, \$65.60.

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FADA Radio

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The new FAHNESTOCK Display Case will stimulate your sales of Fahnestock Radio Products. 14 of the most popular styles and sizes are included. Shows the purchaser instantly the correct piece for his set. A constant invitation to buy Fahnestock Products. Dealers are offered 200% profit on each case, an unusual offer on standard merchandise.

Price to Dealer..... \$17.50
West of Mississippi..... 18.50
Transportation prepaid when money order or check accompanies order. Subsequent orders at regular price of \$20.00.
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Refills will be supplied at the regular 100 lot prices, shown in catalogue, which comes with case, less discount shown on enclosed sheet. Send check or money order, today.

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Sets a New Crystal Standard

Star-ite "Loud All Over" Crystals are distinctly a new, big step in the Radio World. The present Radio Era began with the crystal set which fell behind because the more important part of the set—the crystal—had fallen in quality due to cheapening of the product.

Star-ite is doing much to re-standardize crystal set performance and with the coming of re-broadcasting, when your crystal set will enable you to hear concerts and speeches from New York and Washington you will not hesitate to pay even \$5.00 for a crystal like Star-ite.

Sold by all fine, wide-awake dealers who are fast stocking Star-ite, but should your dealer not be able to supply you send \$1.00 to us for one of these great crystals, sent post-paid and your \$1.00 back if you are not satisfied.

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MAGNATRON

MAGNATRON DC-199 knows no superior among dry cell tubes. Whether as detector or as amplifier, it will give better results in your set. It and the MAGNATRON DC-201A are unqualifiedly indorsed by experts.

Your dealer has these tubes. They list at \$5.

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PERFECT BATTERY SWITCH

Sold by leading Radio Dealers and Jobbers

Nickel plated locknut and polished knob

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For Battery Circuits Prevents accidental burning of radio tubes and avoids premature discharge of batteries.

Improves Your Radio Set
Drill only one hole in your radio panel to install the Bradleyswitch. Nickel-plated knurled nut holds it securely in place. Totally enclosed and dustproof.

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Manufacturers of the Universal Bradleystat

Questions and Answers

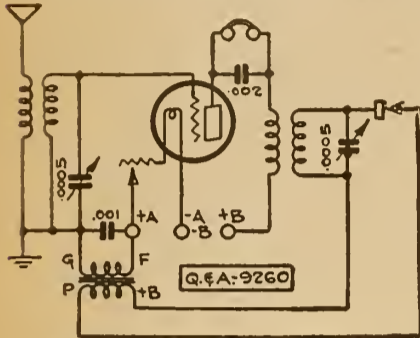
Reflex Circuit

(9250) DJW, Atlanta, Ill.

Please show a diagram with one stage of audio frequency amplification of the hook-up given in the May 10th issue of Radio Digest, page 29. Give the capacity of the fixed condenser across the phones.

A.—The circuit was submitted by a correspondent and published on his authority for its effectiveness. The circuit is a single tube nonregenerative which presents limitations in volume.

We are improving this circuit as shown



in the diagram. As it is the reflex action is not carried to involve audio frequency as well as Radio frequency amplification and it will therefore be found advantageous to complete amplification by the addition of a standard low frequency transformer in the reflex method. This will provide amplification comparable with your contemplated stage of straight audio frequency without involving an additional tube.

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AGENCIES OFFERED For the Exclusive Distribution of "OSCILTONE" RADIO TUBES Guaranteed for 1,000-Hour Life A small investment required for carrying local stock. No losses involved. Will also consider direct selling agents. Good opportunity is offered to the right men. First come first served. R-C MILLS RADIO CORP. 303 FOURTH AVE. NEW YORK CITY

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of only hearing LOCAL stations on your Crystal Set? There's music on your aerial every night from stations far away. If you want to hear it without buying a tube set, WRITE ME TODAY.

LEON LAMBERT 501 South Volusia Wichita, Kansas

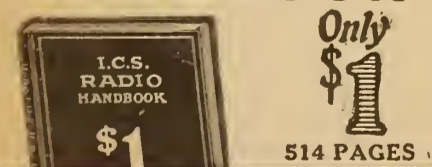
PATENTS Procured. Send sketch or model today for examination, prompt report and advice. No charge for preliminary advice. Write for free Booklets "How to Obtain a Patent" and "Invention and Industry" and blank form on which to disclose your idea. Highest references. Promptness assured. Clarence A. O'Brien, Registered Patent Lawyer, 2002 Security Bank Building. Directly across the street from Patent Office, Washington, D. C.

Wanted

An established organization or live radio manufacturer with capital to become interested in a SUPER-HETERODYNE TRANSFORMER which is guaranteed to successfully compete with high priced transformers in performance.

Transformers will be supplied in knockdown at an amazingly low figure. This transformer can be marketed at a price which makes it impossible for others to compete. Only up to the minute organizations will be considered. Write giving full particulars. Box 712, care Radio Digest, 510 N. Dearborn Street, CHICAGO.

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Just off the press! The greatest book on Radio ever written. Price only \$1. Filled with sound, practical, tested information for every radio fan, from beginner to hard-boiled owl. Written, compiled, and edited by men of national reputation. Every page tells you something useful—and there are 514 pages. Mail \$1 to-day and get this I. C. S. Radio Handbook before you spend another cent on parts. Money back if not satisfied

TEAR OUT HERE INTERNATIONAL CORRESPONDENCE SCHOOLS Box 8277-K, Scranton, Penna. I enclose One Dollar. Please send me postpaid—the 514-page I. C. S. Radio Handbook. It is understood that if I am not entirely satisfied I may return this book within five days and you will refund my money.

If preferred, however, a stage of audio frequency can be added as shown on page 15 of the September 1 issue of Radio Digest.

Fixed condenser across the phones should be .002 microfarad.

Buzz Interference

(07131) MR. Sanford, Fla.

As a reader of your admirable paper I would like to have your advice on a matter which is very important to the Radio fans in and near Sanford. For some time the fans close to here have been bothered with a loud deep toned buzz. I have heard this buzz in the daytime and it seems to be up on the wavelengths around four hundred and fifty meters.

From my explanation can you tell what this might be, and what would be the right steps to take in having this nuisance stopped?

This buzz is not continuous. Some nights it will come on, and stay on steady for hours, while on others it is off and on.

A.—We regret that we are unable without a knowledge of conditions in your environment to offer any very helpful

SELL Coal in Carload Lots. Side or Main line. Experience Unnecessary. Earn week's pay in an hour. Liberal drawing account arrangement. WASHINGTON COAL COMPANY, 945 Coal Exchange Building, Chicago.

Bankrupt Stock

Cunningham Regenerative one tube long range sets \$9.00 Each

Formerly sold at \$32.50

No Circuits. Order from This Ad. This set with tube, phones, all batteries and aerial complete, \$21.00 ready to use, for.....

Prepaid while they last.

S. A. TWITCHELL 1925 Western Av., Minneapolis, Minn.

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Super-Heterodyne Transformers

Special Remler Models for Experimenters



Complete kits for building this wonderful receiver.

We have every standard brand of apparatus. Get our catalog.

DEALERS—SEND FOR INFORMATION

BADGER RADIO CO. 495 E. WATER ST. CHICAGO, ILL.

What About It?

Isn't it about time to stop experimenting with multiple control circuits and build one that, combining ease of assembly and operation, loudness, clarity and selectivity of signals, as well as beautiful appearance, is excelled by none?

THE ELGIN SUPER-REINARTZ RADIO RECEIVING SETS

Embodies all the advantages of the well known Elgin Reinartz (the set which was largely responsible for the popularity of this wonderful circuit) and many others. It is much louder, more selective, requires no storage battery, and can be used with excellent results on a short or loop aerial.

It has brought in 2LO England, and California stations two thousand miles from Elgin, clearly and without interference on a loud speaker with only one tube, and that while our powerful local station was broadcasting three miles away. Could you ask for more.

Send 2-cent stamp for circular giving one, two and three bulb hook-ups of this remarkable circuit.

ELGIN RADIO SUPPLY CO. 207 East Chicago Street ELGIN, ILLINOIS

suggestion as to the source of interference to which you are subjected in operation of your receiver. It could be due to varying factors, such as high tension lines in vicinity or operation of an electrical appliance nearby. It will be necessary to trace the disturbance to its source in order to determine if remedial measures are possible. Such conditions are often

FREE Attractive Radio Catalogue

Just write your address. You need not include stamps.

NOVICK RADIO CO.

1522 Charlotte St. Bronx, New York City

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ARAGON'S SILVER INDOOR AERIAL

Made of Phosphor Bronze and Sterling Silver. Can be used in any size room.

Has capacity of 150-foot Outdoor Aerial. Cuts down Static—Gives sharpest tuning. Practical and ornamental—for any home. Shipped all ready to be installed.

Aerial Complete.....\$2.50

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Super Heterodyne

Immediate Delivery - Attractive Discounts

Branson Kit No. R. 100, Complete, \$36.50

Contains—3 Intermediate R. F. Transformers,

each.....\$6.50

1 Special Transfer Coupler.....7.50

1 Special Oscillator Coupler.....5.00

1 Antenna Coupler.....4.50

Book of Instructions with Template, Blue Prints 1.00

All American R100—75—30 K. C. 10,000 M Transformers.....\$6.00

Acme 30 K. C.—10,000 M Transformers.....5.00

Hilco Oscillating Coupler.....7.00

Hilco Antenna Adjustable Coupler.....8.00

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